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SUMMARY OF RECENT ABSTRACTS *

VII. HELMINTHIASIS †

(Continued from p. 856)

Hookworm infection: Strongyloides, etc.

In Lucania, Italy, where the main industry is agriculture and human faeces are used as manure, hookworm infection was apparently not reported until 1946, but PETRONE (p. 720) states that it became endemic then and that an explosive outbreak occurred in 1956. DENES DE NEGRI and LUPPI (p. 1211) also write of hookworm infection in part of the delta of the river Po where 50% of market gardeners are affected, but they note that most of those found positive have been in good health. A focus of hookworm infection has long existed on the outskirts of Naples, in agricultural workers, and the most effective preventive measure has been the almost complete urbanization of the area (IZZO, p. 1439).

Hookworm infection is prevalent in parts of Texas, and HENDERSON (p. 1440) reports it in 1·7 to 51·3%. Having compared various techniques he concludes that direct smear is of little value for detecting the infection, but is useful for finding patients requiring treatment. Flotation methods are needed in surveys. MELVIN *et al.* (p. 185) find the dilution count more accurate than the direct smear in estimating the weight of hookworm infection, and WATSON and AL-HAFIDH (p. 984) have devised a modification of the Baermann funnel technique for establishing the infection potential of carriers. Details are given in the original abstract.

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1957, v. 54. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on helminthiasis in this series see the August and September issues of the *Tropical Diseases Bulletin* each year since 1939.

Miranda (p. 185) examined the sternal marrow in hookworm infection and trichuriasis; most of the patients had both infections. Details are given in the original summary.

By a technique of labelling erythrocytes with radio-active chromium, Roche *et al.* (p. 1336) have been able to estimate the average loss of blood by the host, per worm—*Necator americanus* 0·03 ml. per day, *Ancylostoma duodenale* 0·2 ml.—but there was no close relation between the amount of blood lost and the number of hookworms.

Noel (p. 1441) gave thymol and oil of chenopodium, with magnesium sulphate and castor oil, slowly by duodenal sound, for hookworm infection and the results were reasonably good. They were improved if a solution of bicarbonate was given first, to wash any coating of food from the worms. Sheth *et al.* (p. 186) found Win 5047 (Mantomide) very useful in severe infection.

Hookworm infection is very heavy in parts of Turkey, and Mimioglu and Akyol (p. 184) now report the finding of *Trichostrongylus colubriformis* there for the first time. As a point of differentiation of the eggs of *Trichostrongylus orientalis* and *A. duodenale*, Kikuchi (p. 721) found that the former survived at temperatures around freezing point whereas the latter did not.

Deschiens and Bénex (p. 1442) used bismuth subnitrate and stannous oxide for *Strongyloides* infection, having experimented with cultures of larvae. 5 patients were treated and were clinically cured. *Strongyloides fülleborni* of the chimpanzee does not complete its development in the guineapig, but Deschiens and Bénex (pp. 65, 186) observed that subcutaneous inoculation of the larvae provoked a strong eosinophilia which reached its peak 10–20 days after the infection. The work has a bearing on human eosinophilia and the failure of *A. caninum* to develop beyond a certain point in man.

Larva migrans

Beaver (p. 722) sums up the literature on nematode larva migrans, which never reaches maturity in the uncongenial host. *A. caninum* was found by Komiya *et al.* (p. 1109) to survive *in vitro* for up to 6 weeks in various media, and copulation took place in dog serum at 37°C., with the production of eggs. In experiments on dogs infected with *A. caninum* and *Toxocara canis* Tokumo (p. 968) found evidence of parasitic mesenteric lymphadenitis, and noted similar changes in man. There may be a toxic or allergic factor, or the condition may be due to the physical and chemical effects of the wandering larvae.

Multiple creeping eruption due to *A. braziliense* is common in south-eastern United States; treatment is unsatisfactory but Burks and Kingery (p. 461) write optimistically of chloroquine given by mouth, which they tried in a few cases. Schacher and Danaraj (p. 1442) treated larva migrans, probably due to *A. braziliense* or *A. ceylanicum*, with diethylcarbamazine, but failed to kill the larva though slowing its movements.

Ascaris infection

Investigating the survival of *Ascaris lumbricoides* eggs in soil, VOÛTE (p. 322) concluded that though they persisted for several weeks or months, the destruction which eventually took place was the result of bacterial action. In market gardens soil exerted a lethal action during the season when green vegetables could be grown and gardens are therefore not likely to be a source of infection. With TROELSTRA he (p. 323) reiterates this view, and explains the familial infection which is observed in part of the Netherlands by poor hygiene in the use of privies.

SADUN *et al.* (p. 1212) made clear suspensions of eggs taken from adult female *Ascaris*, and found that by using a photometric method they could arrive at an estimate of concentration of eggs more rapidly and consistently than by direct egg counts.

AIKEN and DICKMAN (p. 1338) report several cases of obstruction of the small intestine due to *Ascaris*; if this is complete, mortality may be high; resection may be necessary, but treatment with piperazine citrate may render surgery unnecessary.

Ascaris infection of the bile passages (for which operation is often necessary) has attracted attention. In Tsingtao, China, where *Ascaris* is common, WANG *et al.* (p. 323) report 141 cases of biliary ascariasis, and describe the symptoms of colic in the upper abdomen due to spasm of the sphincter of Oddi. Similarly in the Shanghai area LIANG *et al.* (p. 1213) refer to symptoms resembling those of an acute abdominal emergency, sometimes with fever and jaundice. NISHIMURA (p. 723) observes that physical signs are few. Worms are found mostly in the common duct, rarely in the gall bladder, but ASAKURA (p. 187) states that the eggs and cuticle of the worm may form the nuclei of gall stones, the albuminoid covering becoming the basis of precipitation of calcium compounds. ATSUMI (p. 724) also observed precipitation of calcium round eggs introduced into the bile passages of dogs, and subjected to stasis, and also mentions infection with *Escherichia coli*.

BRUTON and JAFFURS (p. 1339) comment on larval granulomatosis caused by ascarids of cats and dogs accidentally infecting man, and describe a case in which diagnosis of *Toxocara canis* larvae was made by needle biopsy of the liver. The condition may be suspected in a dirt-eater, or a person in much contact with animals; eosinophilia and high concentration of gamma globulin are usual.

In a large number of patients with *Ascaris* infection HOEKENGA (p. 591) found that the various piperazine salts cured about 90% in courses of 1 or 2 doses, and the toxic effects were negligible. Hexylresorcinol alone was much less effective but when added to a piperazine salt it increased the cure rate. BROWN (p. 66) and ATCHLEY (p. 325) write favourably of the citrate and though GREUEL (p. 591) mentions transient toxic symptoms in one child given moderate doses, FUHRMANN (p. 1110) states that the citrate and the tartrate are well tolerated and are equally effective when

equal amounts of base are present. The adipate was satisfactory as a single dose of 6 gm. for adults in Egypt, and RIFAAT and NAGATY (p. 725) refer to the advantage of a single-dose treatment, as also do NINANE *et al.* (p. 1338) who gave 200 mgm. per kgm. followed by castor oil the next morning.

STRANSKY and REYES (p. 65) treated ascariasis with papain and, for comparison, with diethylcarbamazine, concluding in favour of papain. In comment, however, Napier criticizes the method of comparing the two preparations.

Filarial Infections

General

GORDON (p. 325) discusses the essential data in a filariasis survey, pointing out that it is more important to know the proportion of the population harbouring microfilariae in numbers sufficient to infect the vectors, than to know the actual incidence of the infection in man. Similarly the intensity of infection of the vectors should be assessed because the number of parasites introduced by a vector probably influences the course of infection. The pathogenicity of the parasite to the vector and to the vertebrate host is important, and of course the question of an animal reservoir must be investigated; it has become prominent recently in connexion with *Loa loa* and *Wuchereria malayi*.

Wuchereria bancrofti

Microfilariae of *W. bancrofti* were found by YOELI (p. 848) in 11·6% of Indian Jewish immigrants into Israel, and though there was no evidence of new human infection there, some *Culex molestus* in the houses were found infected, and in experimental work high rates of infection were found with this species. In Mwanza, on Lake Victoria in Tanganyika, JORDAN (p. 729) found microfilariae in 15–30% of adult males. Lymphadenitis occurs but is generally less severe than in the Pacific; scrotal elephantiasis is still fairly common, and hydrocele is the most important clinical manifestation.

In part of Bihar KANT *et al.* (p. 462) found microfilariae in 18·7% of the population; incidence was low in childhood and rose steadily to age 50. *Culex fatigans* was the only vector, with an infection rate of 11·9%.

In north-west New Guinea an investigation was made in 2 villages, and DE ROOK (p. 1214) reports high rates of infection with *W. bancrofti* of periodic type, with many gross manifestations including elephantiasis and hydrocele. Information is given on transmission, and on the possibility of control by insecticides. *Culex bitaeniorhynchus* is common in a town of New Guinea, and BONNE-WEPSTER (p. 463) states that there is circumstantial evidence that it is a vector of *W. bancrofti* there.

FAN and HSU (p. 66) report on a survey in southern Taiwan and the Pescadores islands which revealed an incidence of 4·8% filariasis. The

indigenous people were infected with *W. bancrofti* but people from the mainland showed either *W. bancrofti* or *W. malayi*. Most of the infections were light. Fan and Hsu (p. 1443) surveyed villages in the Penghu archipelago between Taiwan and the mainland, finding microfilariae of *W. bancrofti* in 12·79%. The infection was more common in females than males, probably because the men are mainly fishermen and are less exposed to it.

Larval filariae have been found by Hsieh *et al.* (p. 730) in 3 species of *Anopheles* in Taiwan, but the identity of the larvae has not been established.

In Recife, Brazil, Rachou *et al.* (p. 1444) found infection in up to 13·1% in different parts of the city. *Culex fatigans* was the common mosquito and 7·3% of a large number harboured filarial larvae. In a recent small focus in Manaus, Brazil, the infection was shown by Rachou and Lacerda (p. 1340) to be transmitted by *C. fatigans*. It is the first focus to be found in the interior, all the others being on the coast.

Backhouse and Woodhill (p. 68) found *Aëdes pseudoscutellaris* and *Aëdes polynesiensis* highly susceptible to *W. bancrofti* from New Caledonia; the Sydney strains of *Aëdes vigilax* and *C. fatigans* were also highly susceptible. *Aëdes polynesiensis* is the vector of non-periodic *W. bancrofti* in the Cook Islands, breeding in coconut shells and old tins. Iyengar (p. 726) recognizes this as a major health problem and suggests methods of control of the vector.

Bonnet *et al.* (p. 728) describe an intensive survey method for collecting mosquitoes, which they have applied in Tahiti; the mosquitoes are examined for filarial infection. In the period 1953–55 there was a general reduction in the rate of capture, which is attributed to successful control measures. Moreover, the average number of filarial larvae per mosquito decreased markedly when the people were treated with diethylcarbamazine. In Tahiti *Aëdes polynesiensis* breeds extensively in rot holes in trees, and the most important tree from this point of view appears to be the bread-fruit which, as Bonnet and Chapman (p. 728) point out, is abundant and grows near dwellings. They discuss prevention of such breeding and have devised a method of filling the rot holes with earth and a growing fern or similar plant. Jachowski (p. 1341) notes that non-periodic *W. bancrofti* infection is endemic on Swain's Island, American Samoa, and that *Aëdes polynesiensis* is apparently the vector.

Dissanaike *et al.* (pp. 849, 1215) were able to produce radio-activity in adult *C. fatigans* by rearing larvae in media containing radio-active phosphorus. When these adults were infected with microfilariae of *W. bancrofti* the larval worms in them also became radio-active. The radio-active larval worms could be followed through in the vertebrate host, either by using a β counter or by autoradiography. It is, however, suggested that radio-active sodium, rather than phosphorus, may be more effective.

McFadzean and Hawking (p. 726) investigated periodicity in the larvae

of *W. bancrofti* in volunteers, by varying the oxygen and CO_2 content of the blood, administration of chemicals and hormones, and other means. They conclude that there is an active phase during which the microfilariae are concentrated in the lungs (which are probably the optimum habitat) and a passive phase in which they are evenly spread between lungs and peripheral blood. Concentration in the lungs is not due to any opening or shutting of capillaries by the host, but must depend on the microfilariae themselves reacting to some stimulus provided by the 24-hour rhythm of the host, but the nature of this is not known. In a study of the periodicity of larvae EDESON *et al.* (p. 1340) found that *W. malayi* behaved like African *W. bancrofti*, but that when a subject with non-periodic *W. bancrofti* was given oxygen there was a slight rise in microfilarial count instead of a slight fall as with the African *W. bancrofti*. There are, however, too many other factors for the correlation to be simple. YOELI (p. 986) reports observations on agglutination and thigmotaxis of microfilariae in *W. bancrofti* infection, and discusses the relationship between the agglutinating phenomenon and filarial periodicity.

ROWLANDS (p. 326) estimated the distribution of microfilariae of *W. bancrofti* in the organs of a man who died after a brief illness in Ghana. The lungs and heart muscle contained many more per unit of volume than other organs. It was not possible to correlate distribution with any particular phase of the periodic cycle.

BEYE *et al.* (p. 67) used an antigen from *Dirofilaria immitis* in a skin test for filariasis in Tahiti. The proportion of positive results increased with age up to 87% in those over 13 years; the proportion showing microfilariae in the blood was much smaller. The antigen was also used, with some success, as a desensitizing agent in lymphangitis. Experimenting on complement-fixation tests with an alcoholic total antigen from *D. immitis* MINNING and MCFADZEAN (p. 986) found that the sera of persons with filariasis reacted, but the antigen did not give uniformly positive reactions in dogs infected with *D. immitis*. The implications of this are discussed.

ROMITI (p. 68) discusses the primary aspect of Bancroftian filariasis, which in British Guiana is usually varicolymphocele of the spermatic cord. He traces the further development of the disease as he has observed it in a large number of operations. NEHAUL (p. 464) analyses the clinical manifestations of *W. bancrofti* filariasis in British Guiana, noting attacks of fever (in 75%), lymphangitis (53%), adenitis (53%), funiculitis or spermatic cord thickening (29%), elephantiasis (74%), hydrocele (19%), abscess (18%) and other less frequent conditions.

In Tahiti, where filariasis is very common and many people suffer from attacks of lymphangitis, THOORIS *et al.* (p. 850) tried various courses of diethylcarbamazine, finally preferring *Notézine-retard* in a dosage of 3 mgm. per kgm. twice daily on 1 day each month. In Niue Island where 22·1% of the people carried microfilariae of *W. bancrofti* SIMPSON (p. 1112) gave diethylcarbamazine each month to all the inhabitants, and found

only 2·9% positive over 2 years later. These results were very encouraging, though other factors than the drug may have played a part in them.

Thooris (p. 71) treated *W. bancrofti* infection with sodium thiacetarsamide, and observed good results, but in comment Hawking recalls the possibility that it may cause necrosis of the liver. Thooris (p. 72) also used suramin for *W. bancrofti* infections, some with lymphangitis or elephantiasis, finding a definite action on the filariae. In comment Hawking makes the point that since diethylcarbamazine is effective and non-toxic, the use of suramin will seldom be indicated.

Ojha (p. 70) in India observed that injection of calcium gluconate increased the swelling of elephantiasis, and knowing that fluorides reduce blood calcium he gave sodium fluoride by mouth, and observed considerable improvement. He recalls the fact that in areas of endemic fluorosis filariasis is absent, and suggests that this may be due to low serum calcium levels in those areas.

Wuchereria malayi

Nelson and Heisch (p. 592) record the important finding of sheathed microfilariae resembling those of *W. malayi* in 7 cats and 1 dog in Patta Island, a few miles off the coast of Kenya. The people of the island harbour *W. bancrofti*, but no microfilariae resembling *W. malayi* have been found in them. Sheathed larvae resembling those of *W. malayi* were found by Pattanayak and Raghavan (p. 730) in cats in India, and in comment Buckley refers to similar findings in non-human hosts in Malaya and Kenya, and emphasizes the importance of recovery and identification of the adult worms.

Iyengar (p. 325) reports studies on the development of *W. bancrofti* and *W. malayi* in blood and in the mosquito vectors. Details should be sought in the original abstract.

Both *W. bancrofti* and *W. malayi* are found in Travancore-Cochin State, India, and a survey by Jaswant Singh *et al.* (p. 462) showed endemicity rates of 10·6% and 21·7% in 2 areas. *W. bancrofti* was much the more common. *C. fatigans*, *Mansonioides uniformis* and *M. annulifera* were the only mosquitoes found carrying the infections. In Shertellai Taluk, Travancore-Cochin State, Jaswant Singh *et al.* (p. 852) found infection (almost all by *W. malayi*) in up to 33% of some villages. *Mansonia annulifera* and *M. uniformis* were infected, but removal of *Pistia* from the water tanks does not seem to have reduced the incidence materially.

In a campaign against the vectors of *W. bancrofti* and *W. malayi* in Travancore-Cochin State Jaswant Singh *et al.* (p. 464) found BHC and dieldrin equally effective, but not for more than about 12 weeks.

Faust (p. 854) summarizes published reports of human infection with species of *Dirofilaria*. 3 instances appear to be valid, but others are interpreted as infections with species of *Nochtiella*. Details should be sought in the original.

Eosinophilic lung

JARNIOU and MOREAU (p. 1111) observed 2 cases in which eosinophilic lung was associated with lymphadenopathy due to *W. malayi*, and in which treatment with diethylcarbamazine was successful.

DANARAJ *et al.* (p. 1341) and DANARAJ (p. 1342) have successfully treated with diethylcarbamazine a large number of patients suffering from tropical eosinophilia, but no evidence of filariasis was found in them. They now report 12 patients with tropical eosinophilia in whom a complement-fixation test with an antigen from *D. immitis* was positive before treatment, and became negative as the eosinophilia decreased after diethylcarbamazine. The test was only occasionally and weakly positive in other subjects with *W. bancrofti* or *W. malayi* infection, and the authors think that infection with some non-human filaria, which cannot establish itself completely in the abnormal human host, but which causes marked cellular and serological response, may be responsible for eosinophilic lung.

Onchocerca volvulus

FAWDRY (p. 1114) gives the first account of onchocerciasis in Arabia, where he has observed a few cases in areas where permanent streams exist which would be suitable for the breeding of *Simulium*, though these have not been found.

LEWIS (p. 75) describes the Simuliidae of the Sudan. MUIRHEAD-THOMSON (p. 466) observed the phenomenon of communal oviposition by a swarm of *Simulium damnosum* which settled on a leaf trailing in a stream in Liberia. But there are reasons for believing that oviposition is not always done in this mass way. EDWARDS (p. 74) gives an account of onchocerciasis in Ghana, discussing the survival of *Simulium* in areas where streams dry up for several months of the year. Pupae and larvae do not survive desiccation, and it appears that survival may occur in the egg stage. Eggs have been kept alive in the top layers of dry river beds for at least 3 months. An extensive study of *S. damnosum*, probably the only vector of *O. volvulus* in the Northern Territories of Ghana, is reported by CRISP (pp. 594, 595). Its breeding is not confined to large rivers. It bites man almost exclusively on the legs, and is undiscriminatingly zoophilic. It does not move far from damp riverine microclimate in the dry season, which it probably survives in the adult form. He discusses all phases of its life history, and suggests a scheme for control, and shows on a map the association between *S. damnosum* and onchocerciasis. He also (p. 328) discusses the natural enemies of the various species of *Simulium* found in the northern part of Ghana.

CROSSKEY (p. 596) details the distribution of *S. damnosum* in Northern Nigeria; it is closely associated with pre-Cambrian rock on which the rivers form suitable rapids, and most foci of fly are found when the dry season lasts no more than 5 months, and rainfall is over 45 inches. Onchocerciasis is essentially a rural problem. In a general account of the

Simuliidae of Northern Nigeria the same author (p. 855) observed that a willow (*Salix ledermannii*) is associated with *S. damnosum*. Pupae are commonly found on trailing grasses in the water, but also on sticks and loose stones. Suitable breeding rivers depend on the geology of the region, and breeding is found up to an altitude of 4,500 feet, but altitude and type of vegetational zone are not important. He (p. 1114) found adult *Simulium bovis* commonly in Northern Nigeria, and observed that 6% were infected with filarial worms morphologically the same as *O. volvulus*, though this fly has not hitherto been shown to be a vector. Nevertheless, it bites man frequently, and might transmit the infection.

Wanson (p. 327) found a race of *S. damnosum*, in small rivers of the Belgian Congo, which did not attack man, and suggests that different feeding preferences of the adults may be related to the speed of the current in which the larvae occur, and therefore possibly to differing oxygen content and larval food.

Jamison and Kershaw (p. 731) have devised a method of measuring in the skin the changes which accompany aging and onchocercal infection. The principal changes in onchocerciasis are that the thickness of the subepidermis is increased 2 or 3 times whereas the thickness of the papillary peg remains unchanged. The paper contains much detail and should be read in full.

In part of Northern Nigeria Budden (p. 74) estimated that onchocerciasis was the cause of blindness in 0·2 per 1,000 persons living in non-endemic areas, these being emigrants from endemic areas. Blindness rates up to 10% were found in the more heavily infected villages. Heavy incidence has led to a reduction in population density, probably because of the high rate of blindness, and this may permit encroachment by tsetse flies. He (p. 1007) gives an account of the natural history of onchocerciasis, on the basis of his experience of eye disease in a highly endemic area. In heavy infection there is often extensive involvement of the anterior segment of the eye, and choroido-retinal degeneration may be seen. He discusses the course and prognosis of these eye changes.

Lavier *et al.* (p. 328) describe the pathological condition of the excised eye of a patient with onchocerciasis. The vascular lesions dominated the picture, those of the limbus being recent but those of the retina and choroid being much older, and possibly the result of a toxic cause rather than direct invasion by microfilariae. It is possible that therapeutic larvicides may provoke toxic inflammatory responses in the eye. Rodger (p. 1467) discusses acute ocular onchocerciasis—limbitis, sclerosing keratitis and anterior and posterior uveitis. These are usually seen in a subacute or chronic stage but an acute stage has probably usually existed. Blindness is most likely to occur in the acute stage and treatment is therefore important. He gives TAB vaccine followed by diethylcarbamazine.

After a large series of serological tests for syphilis on patients with onchocerciasis, in which the Kolmer, the Kline and the VDRL tests were

used, D'Haussy *et al.* (p. 1216) conclude that a positive reaction from the 3 tests is a true indication of antecedent treponemal infection, and that there is no relationship between syphilis and the development of the eye lesions of onchocerciasis.

Duke (p. 732) made a series of careful examinations of patients with onchocerciasis before and regularly after treatment with diethylcarbamazine which cleared the skin. He found that within a year the density of microfilariae had reached more than half the previous level, and that they tended to return to the same sites, and in the same proportions, as before treatment, so that the pattern of distribution was maintained. This is particularly important if the skin near the eye is affected, and where the microfilariae build up again after treatment. The suggestion is made that courses of treatment should be repeated frequently enough to prevent the development of anterior segment lesions—every 3–6 months, or preferably, in populations subject to supervision, by daily or weekly doses.

An ingenious method of applying DDT to streams for the control of *Simulium* in the Cameroons was devised by Wilson (p. 596), who used impregnated sawdust balls wrapped in absorbent toilet paper, which were thrown into the streams once each week during the dry season; there was a marked decrease in breeding. Blanc (p. 76) shows that in the Upper Volta area fish could withstand 8 mgm. DDT per litre of water for nearly 2 hours, whereas *Simulium* larvae were killed at half this strength in 30 minutes. The safe use of DDT is therefore a matter of proper measurement. Similarly, in Ghana Noel-Buxton (p. 188) used DDT at 0·03 and 0·044 p.p.m. in rivers to control *Simulium*, with success for at least 40 miles below the treatment points and without damage to fish or oysters.

Blanc and d'Aubenton (p. 1342) found 1·5 to 3 parts DDT per million fully effective in killing larvae, but not pupae, of *S. damnosum* in the Black Volta. Several treatments were needed to rid the stream of the insects, and there was little evidence of toxicity for fish, though some damage was apparently due to the kerosene solvent.

Loa loa and Dipetalonema perstans

Bickerstaff (p. 593) observed that infection with *L. loa* brought about a return of migraine in a patient who had long been free from it. The migraine was relieved by an antihistamine and the author thinks that it was an allergic response. It disappeared when the infection was cured with diethylcarbamazine. Thompson (p. 593) used corticotrophin with great success to control the intense pain, and swelling, occasioned by the treatment with diethylcarbamazine of a patient with multiple Calabar swellings.

Duke and Hawking (p. 592) confirmed an earlier finding that when a general anaesthetic was given to patients with *L. loa* infection there was a sharp fall in the microfilarial counts: this is in contrast to findings in animals with filariasis.

Duke *et al.* (p. 466) investigated the relationship between the size of the blood meal taken by *Chrysops silacea*, the development of the ovaries and of the microfilariae of *L. loa* taken in with the blood meal. Some flies had undeveloped ovaries but had infective larvae of *L. loa*. In observations on the size and pattern of blood meals taken by *Chrysops silacea* and *C. dimidiata* Kershaw *et al.* (p. 853) concluded that they ingest about twice their weight of blood.

Kershaw *et al.* (p. 1113) observed the pattern of biting in *Chrysops silacea* infected with *Loa loa*. Flies which have rid themselves of the infective forms of *L. loa* probably rarely survive to take up another blood meal. The pattern of survival can be assessed, but it is not possible yet to say whether mortality increases with age in natural conditions.

Duke (p. 852) calculated the intake of microfilariae of *Dipetalonema perstans* by *Culicoides grahami* and *C. inornatipennis*, in which full development of the microfilariae took place.

Schneider and Husson (p. 73) found the compound TWSb (antimony-dimercapto-potassium succinate) effective against *Dipetalonema vanhoofi* of baboons, which resembles *D. perstans*; diethylcarbamazine was not effective. In comment Hawking suggests trial of TWSb in *O. volvulus* and *D. perstans* infections of man.

Mansonella ozzardi

In part of the Yucatán peninsula Biagi (p. 465) found *Mansonella ozzardi* in 50–85% of the people, the incidence rising with age after the age of 3 years. Intradermal tests with *Dirofilaria* antigen were positive in half the people tested, and precipitin tests in still fewer. No specific symptoms were noted. Bruijning (p. 1215) notes that *Culicoides guttatus* is very common where *Mansonella ozzardi* is common in Surinam, and has been found to harbour filarial larvae.

Dracunculus medinensis

In a study of the development of guineaworms in dogs Onabamiro (p. 329) suggests that larval worms travel from the alimentary canal to the subcutaneous tissue probably through the lymphatic system, reaching the subcutaneous tissue by the 43rd day.

Jaswant Singh and Raghavan (p. 1446) give a general account of dracontiasis in India, and point out that there are many measures of control related to water, and that DDT wettable powder is effective against cyclops at 5 p.p.m.

Enterobius, Trichuris and Capillaria

Duran-Jorda (p. 1448) in Manchester found *Enterobius* in a high proportion of appendices removed from children. Most of the larval forms were buried deep in the tissues, where they become adult. These return to the surface and lie in the superficial layer before they eventually reach

the lumen. Damage to the tissues therefore occurs at 2 stages, and there is danger of infection at each.

In a survey of *Enterobius* infection in old people in northern France Coutelen *et al.* (p. 330) found great variation in incidence, from 0 to 79% in different communities. The infection is not troublesome and is usually ignored by the infected persons. Having noted the fact that the incidence of *Enterobius* infection in mixed communities is not uniform, Coutelen *et al.* (p. 735) made a series of examinations by peri-anal swabbing at intervals of one week for 7 months, on a group of children living under identical conditions. They conclude that as some remained relatively free and others were heavily infected, there is evidence of partial immunity in some persons. In naval recruits in the Netherlands Van Thiel (p. 1217) found *Enterobius* in 32·2% and quotes another worker who found it in 62·4% of industrial labourers in Amsterdam. The family is the main source of infection.

Hübner (p. 987) describes cases in which *Enterobius* entered the female peritoneal cavity, presumably through the Fallopian tubes.

Symmers (p. 1218) reports for the first time a case of eosinophilic prostatitis due to *Enterobius* and another due to an encysted nymph of *Linguatula serrata*. The *Enterobius* probably entered by the urethra.

Enterobius infection is widespread in children of an island of the Shetland group. Hill (p. 189) gave mass treatment with piperazine adipate in 2 courses of 7 days, with very good results. 6 months later some of the cured children were again infected, and he concludes that parents also should be treated to prevent reinfection of children. A high proportion of cures with piperazine adipate is also reported by Ricci and Corbo (p. 1344) in children with enterobiasis and ascariasis, but not with trichuriasis or *Hymenolepis nana* infection. Pawłowski and Rydzewski (p. 330) report favourable results from piperazine, but they emphasize the importance of duration of treatment, suggesting at least 3 courses of 7 days each, with intervals of 10 days. The dose of the hexahydrate should not exceed 50 mgm. per kgm. per 24 hours. Jung *et al.* (p. 331) used piperazine citrate for children and, as a single dose each week, for prevention of reinfection. The results were good, and there were no signs of toxicity. Dosage is given in the original.

In a small experiment Bumbalo and Gustina (p. 76) found a preparation of gentian violet in phenol phthalein, given thrice daily for 14 days, effective in *Enterobius* infection.

Jenkins (p. 1343) reports a high proportion of cures in children with enterobiasis, by a treatment consisting of application of zinc ointment 3 times daily for 21 days over the anal region. The object was to prevent the females from laying eggs in that area, and thus to prevent reinfection.

Cavier (p. 581) and Cavier and Debelmas (p. 582) tested cinnamic esters and some aromatic aldehydes experimentally and found them useful against oxyurids of mice.

For *Trichuris* infection Hucker and Schofield (p. 189) used piperazine

phosphate, sebacate, adipate and citrate in courses equivalent to 500 mgm. of the hexahydrate 3 times daily for 7 days. The work was done in a hospital for mental deficiency, and the results were disappointing, unlike some recorded by another worker.

Cochrane *et al.* (p. 1446) describe the first proved case of infection with *Capillaria hepatica* to be found in South Africa; the child was an earth-eater. The important sign of this infection is eosinophilia, with enlargement of the liver, eosinophilic granulomatous liver lesions, leucocytosis and hypergammaglobulinaemia. Laparotomy revealed an enlarged liver studded with yellowish-grey pinhead nodules, and sections showed numerous eggs.

Trichinella spiralis infection

Drury (p. 597) reports a case of trichiniasis from Ireland, and suggests that it may not be rare, as was supposed.

Ozeretskovskaya and Uspensky (p. 988) describe cases of trichiniasis contracted through eating the meat of polar bears in the Soviet Arctic.

Sadun and Norman (p. 737) show that hamsters are susceptible to *T. spiralis*, and that the severity of the infection is proportional to the dose of larvae inoculated. Larsh *et al.* (p. 331) observed a characteristic cellular reaction in the intestinal tissue of young mice given an initial infection with *T. spiralis*. This developed 15–17 days after the infection and was a manifestation of acquired immunity and resulted in the loss of a significant number of adult worms. Coker (p. 332) shows that daily treatment with cortisone after infection suppresses the normal reaction of cellular infiltration in response to the invading worms.

Kershaw *et al.* (p. 735) describe the distribution of *Trichinella* larvae in patients investigated in the outbreak in Liverpool in 1953, noting that examination of the diaphragm at autopsy may not be as accurate a guide as examination of the somatic muscles. There is much evidence that larvae reach the viscera and central nervous system and are destroyed there, the destruction causing obvious clinical manifestations, but clinical signs of involvement of the central nervous system occurred only in patients with a high concentration of larvae in the muscles.

Trichiniasis commonly involves the central nervous system, and much of the clinical picture suggests an antigen-antibody reaction or toxic and allergic elements; Meltzer and Bockman (p. 1345) used corticotrophin and cortisone in one case, with success.

Vogel *et al.* (p. 857) describe the criteria for the diagnosis of trichiniasis and describe a microflocculation test, which is more specific though less sensitive than the complement-fixation test or the Bozicevich flocculation test. They point out that since serological examination may be negative in the early stages of the disease such examinations should be repeated up to 9 weeks after the onset of symptoms. An antigen from larvae from infected laboratory animals was used by Price and Weiner (p. 737) for sensitizing sheep red cells, and these were used for a haemagglutination

test with serum from rabbits immunized with the antigen, and the test was found sensitive and reliable. In comment Kershaw points out that in man the only certain diagnosis is by demonstration of the parasite, most easily done by muscle biopsy; the haemagglutination test, however, is worth pursuing in infected animals.

Sadun *et al.* (p. 1115) show that irradiated larvae of *T. spiralis* when given by mouth to rabbits produce only low titres of flocculation and complement-fixation antibodies, and they make the point that a re-evaluation of the significance of positive serological tests may be necessary if the practice of irradiating pork is widely adopted. Sadun and Norman (p. 1116) compared metabolic and somatic antigens in serological tests for trichiniasis in rabbits given graded doses of the larvae. A rapid slide haemagglutination test for trichiniasis is described by Sadun and Allain (p. 1219); the test is rapid and easy, but its value has not yet been assessed. Norman (p. 598) shows that dehydration and storage in suitable conditions can successfully be applied to the reagents used in the bentonite flocculation test for trichiniasis.

Gould *et al.* (p. 856) investigated the effects of radio-active cobalt and X-rays on larvae of *Trichinella spiralis*. Details should be sought in the original.

The excretion of nitrogenous products of *T. spiralis* and *A. lumbricoides* was studied by Haskins and Weinstein (pp. 856, 857).

Gnathostoma

Yamaguchi *et al.* (p. 734) report gnathostomiasis in Shikoku Island, Japan, and have investigated distribution in animals.

Charles Wilcocks

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

Miller, M. J. **Observations on the Natural History of Malaria in the Semi-Resistant West African.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, Mar., v. 52, No. 2, 152–68, 5 figs. [24 refs.]

"(1) Information is presented for malaria infections in indigenous West Africans living in a community where malaria is highly endemic. Twenty adults were studied continuously for an entire year and 10 children aged 3 to 7 years were studied for 71 consecutive days. Specific therapy was withheld at all times and each malaria attack was permitted to run its natural course.

" (2) Nineteen of the 20 adults were found positive for malaria parasites throughout the year. They showed a wide individual variation in the number of days positive for parasites, but the average for the group was 76 days or 21 per cent. of the time. Only *P. falciparum* and *P. malariae* were seen, the former was present in 19 per cent. of examinations and the latter in 2 per cent. of examinations. Crescents were seen in 16 of the 20 subjects and occurred on an average of 22 days or 6 per cent. of all examinations. Although *P. malariae* was seen in only 2 per cent. of blood examinations, it occurred throughout the year in 10 of the 20 subjects.

" (3) Because children were protected from re-infection during the study, results are not strictly comparable with those of the adult group. Nevertheless, parasites were found in children in 85 per cent. of all examinations and *P. malariae* was comparatively much more common: the ratio of *P. falciparum* to *P. malariae* was approximately 6:4 against a ratio of about 10:1 seen in adults.

" (4) Parasite counts in adults showed wide individual variations, the mean daily count for the group being 56/mm.^{3}. In children the mean daily count was 2,230/mm.^{3}.

" (5) Clinical threshold counts for *P. falciparum* in adults ranged from 30 to 4,550 and the mean count for all attacks was 1,644/mm.^{3}. In children, it was much higher and clinical malaria did not appear until the parasite count exceeded 11,000/mm.^{3}.

" (6) Parasite counts were consistently higher in both adults and children for *P. falciparum* than for *P. malariae* infections. Nevertheless, it was shown that the latter species could initiate clinical attacks with lower parasite densities, indicating a greater toxic reaction for *P. malariae* as compared to *P. falciparum*.

" (7) During the 1 year of study, adults suffered 32 attacks of clinical malaria causing 130 days of morbidity, or 1·5 attacks and 6·5 days of morbidity per person per year. It was estimated that the 6·5 days of morbidity resulted in an average of about 3 days of absence from work. *P. falciparum* was by far the more important contributor to disease causing 30 of the 32 attacks; *P. malariae* caused the remaining two attacks which were relatively mild.

" (8) During the course of the study, subjects in the adult group reported symptoms similar to those seen in malaria attacks but which, on the basis of blood studies, could not be attributed to malaria infections. These are labelled ' pseudo-malaria '; the problem of mis-diagnosing these clinical conditions as malaria is discussed.

" (9) The problem of gametocytogenesis in *P. falciparum* infections is discussed. Evidence is presented indicating that the following three factors may be important in crescent production: first, the occurrence of a clinical malaria attack in the host stimulating formation of an antibody which in turn induces crescent production; second, the efficiency of individual host reactions in the production of the specific antibody; third.

the variation in different strains of *P. falciparum* in their proclivity for crescent production.

"(10) An analysis of the host-parasite relationships in the adult and children groups revealed that, while adults were more efficient in suppressing parasite levels and suffered less from clinical attacks of malaria, children could tolerate higher parasite burdens without showing clinical evidence of disease. This difference is explained on the basis of two different mechanisms operating in resistance to malaria, one concerned with an enhanced ability to detoxify those products of parasite metabolism responsible for the malarial paroxysm (detoxifying resistance) and the other with suppression or elimination of the parasites themselves (antiparasite resistance). The characteristics of the two types of resistance are discussed."

Wilson, D. Bagster. **Malaria in the African.** *Central African J. of Med.* 1958, Feb., v. 4, No. 2, 73–7.

The author rightly draws attention again to the first axiom of malariology, that lessons learnt in one part of the world do not necessarily apply in others, and states that his paper is based on experiences of the eastern side of Africa. He summarizes his views on the epidemiology of malaria [see this *Bulletin*, 1950, v. 47, 677] and illustrates varying degrees of endemicity from recent surveys in Uganda (with parasite rates in the youngest age-group at Jinja of 92%, at Butolo of 44% and at Luwero of 84%).

The interpretation of the findings in a blood smear may be difficult, and a careful distinction must be drawn between the various types of trophozoites of *Plasmodium falciparum*. The thick ring (of the partially immune person) must be distinguished from the compact pigmented form (of the gravely ill), although the presence of actual dividing forms is easy to detect and is usually to be regarded as a danger signal, demanding intravenous therapy. If fine, hair-like rings alone are found, these almost certainly signify an acute infection, whether they are in large or small numbers. Parasite density gives little indication of the severity of the attack—parasites may be found with difficulty in a possibly fatal attack [particularly if drug therapy has been started before the film was taken], while high counts in a partially immune subject may have no significance in the diagnosis of the condition, possibly due to an entirely different cause.

The East African strains of parasite do not respond readily to mepacrine, while the 4-aminoquinolines are very effective. The choice of treatment is dependent upon two considerations: if repeated re-infection is likely, radical cure is not worth while, but if such re-infection is unlikely, radical cure should be the aim; if premunition is present little treatment is necessary, but if it is absent treatment is essential. *P. C. C. Garnham*

Fox, R. M. **Man-Biting Mosquitoes in Coastal Liberia.** *Amer. J. Trop. Med. & Hyg.* 1958, Mar., v. 7, No. 2, 215–20. [16 refs.]

Mosquitoes were collected by the following methods: a man-baited trap (portable), live catches on collectors, morning collections from African houses, and by light-trap in several localities representative of rubber plantation (with forest and swamp), an urbanized area with low secondary bush, coastal savannah, and riverine mangrove. 8 species of anopheline and about 20 of culicine mosquito are recorded with some notes on seasonal occurrence, biting habits, nomenclature and actual or possible association with disease transmission to man.

It is thought that the rarity of *Anopheles funestus* in the areas studied (within about 50 miles of the coast) may be due to residual spraying during and since the war. It is known to be quite common further inland. *A. gambiae* was common throughout the year, and *A. melas* only from December to July, being scarce after the heavy rains had started. No malaria parasites were found in *A. ziemanni*, *A. paludis*, or *A. hancocki*—species taken biting man. Of these species, only one (*A. paludis*) harboured filarial larvae, possibly second-stage bancroftian worms. Interesting points on culicines appear to be: *Mansonioides africanus* and *M. uniformis* were both dry-season species, the latter more common and widely distributed. *Aëdes aegypti* occurred throughout the year, and was the only biting culicine in bush for part of the year. Breeding is reported in permanent pools, wells, rain puddles, tree-holes, cans and utensils. A few adults only were resting in houses. *Aëdes africanus* is also recorded throughout the year, apparently in appreciable numbers in April, mainly in night live catches on baitmen and in the man-baited trap. It is said to feed readily indoors but does not usually rest there; a few only were taken at rest in the huts. [There is no indication of tree-platform collecting.] Only a few *Culex p. fatigans* were taken and this mosquito is apparently mainly to be found in the coastal strip. *Aëdes argenteopunctatus* and *C. galliardi* are new records for Liberia. *D. S. Bertram*

Pereira, M. de C. Sobre a possível mudança de comportamento dos mosquitos vectores (*A. funestus* e *A. gambiae*) numa zona da região de Lourenço Marques. [**Possible Change of Behaviour of** *Anopheles funestus* **and** *A. gambiae* **in the Suburbs of Lourenço Marques**] *Anais Inst. Med. Trop.* Lisbon. 1957, Mar.–June, v. 14, Nos. 1/2, 179–86, 1 map on folding pl. English summary.

In the suburbs of the town of Lourenço Marques the following malarial parasite rates have been recorded: (1937) 56·8%; (1939) 53·5%; (1940) 25·5%; (1941) 16·3%; (1952) 12%; (1953) 15·5%; (1954) 12·9%; (1955) 10·1%. The author attributes the low figures in recent years to house spraying with DDT and BHC [no details given] which has been done since 1945. [This does not explain the fall from 1939 to 1941.]

In trying to discover why the malaria has not entirely vanished, the author searched for vectors in various sites. He found that both *Anopheles gambiae* and *A. funestus* had become much rarer in houses by 1950 and that the decline in numbers continued up to 1955. Searches of larval breeding sites revealed about 8,000 of the vectors (mainly *A. gambiae*) in 1942; roughly 1,000 in 1950–51; and less than 300 from 1952 on. Although the vector anophelines had virtually disappeared in houses and their breeding had been reduced, it was found that small numbers of adults could be found resting out of doors. The author suggests that this may be a change in habits of the mosquito [but there seems no evidence for this]. Of 20 *A. funestus* caught and examined for source of blood meals, 5 had fed on pigs, 2 on goats and the remainder were negative.

J. R. Busvine

Ohmori, Y. **On the Male Hypopygium of the *sinensis*-Group of Anopheline Mosquitoes in Japan.** *Acta Med. et Biologica.* Niigata. 1957, Dec., v. 5, No. 3, 209–17, 1 text fig. & 8 figs. on 3 pls. [18 refs.]

Bejarano, J. F. R. Distribución en altura del género *Anopheles* y del paludismo en la República Argentina. [**Distribution at Different Altitudes of Anophelines and Malaria in Argentina**] *Rev. Sanidad Milit. Argentina.* 1956, Jan.–Mar., v. 55, No. 1, 7–24, 1 map. [65 refs.]

The main endemic areas of malaria in Argentina are below an altitude of 1,750 metres, but some cases are reported from higher altitudes including La Quiaca (3,442 metres). It is known that breeding of *Anopheles pseudopunctipennis* occurs in the valley of the River Calchaqui between 2,200 and 2,700 metres, and that adult mosquitoes are transported by rail as high as 3,480 metres, with transmission taking place, as at La Quiaca. In general, *A. pseudopunctipennis* does not occur above 1,800 metres and there is need to investigate the reasons for this limitation, in view of its occasional occurrence as larvae or as introduced adults at higher altitudes.

D. S. Bertram

Shute, P. G. **Thirty Years of Malaria-Therapy.** *J. Trop. Med. & Hyg.* 1958, Mar., v. 61, No. 3, 57–61. [13 refs.]

The establishment of small compact laboratories in association with malaria therapy centres has helped malaria research in many ways; these are briefly indicated by reference to the Horton Centre where such work has been in existence since 1925, when a Madagascar strain of *Plasmodium vivax* was introduced and has been maintained since that date in over

10,000 patients and 68,000 mosquitoes. Some of the major discoveries made at Horton were the demonstration of the failure of quinine to act as a prophylactic or to prevent relapses; the quotidian cycle of *P. vivax* in primary attacks and tertian in relapses; the pre-erythrocytic cycle of *P. vivax* and *P. falciparum*; the latency phenomenon—still unsolved, but now known to occupy a period of 38 weeks either in new infections or before the first relapse; the problem of strains, which the author stresses must be geographical and not local—for if they were local, crossing would inevitably occur—and for which he cites as examples the quinine-resistant but *maculipennis*-susceptible Italian strain of *P. falciparum* and the quinine-susceptible but *maculipennis*-resistant West African strain; the confirmation of the validity of *P. ovale* by repeated passage in man and mosquito; the diagnostic character of the oöcyst in the 4 human species of parasite.

[Readers of this *Bulletin* will be familiar with the several papers on these subjects published by the author and his colleagues.]

P. C. C. Garnham

Crowther, A. F. **The Chemotherapy of Malaria.** *J. Pharmacy & Pharmacol.* London. 1958, June, v. 10, No. 6, 337–47, 1 fig. [92 refs.]

This article is based on a course of lectures given to a lay audience. The specificity in host-parasite relationships of plasmodia is noted and a brief description is given of their life cycle. The methods of drug evaluation which have been used are mentioned in chronological order. Pamaquin and mepacrine were discovered by the use of the avian parasite *P. relictum*. *P. lophurae* and *P. gallinaceum* and later *P. berghei* have served a useful purpose. *P. cynomolgi* of monkeys resembles *P. vivax* of man and along with the other simian parasite, *P. knowlesi*, has been widely used in laboratory studies. Quinine was the first recognized antimalarial. The first synthetic substance, plasmochin (pamaquin), was described in 1929 by Schulemann [this *Bulletin*, 1932, v. 29, 704] and was based on a modified methylene blue constitution. Related 8-aminoquinolines synthesized later were pentaquine, isopentaquine and primaquine. Certain 4-aminoquinolines such as chloroquine, hydroxychloroquine and amodiaquine have also been used with success. Paludrine (proguanil), a biguanide, and later the pyrimidine derivative Daraprim (pyrimethamine), were discovered.

Drugs may act on sexual or asexual forms of malaria parasites and at different stages of their developmental cycle. Substances like quinine, mepacrine and chloroquine act on asexual forms but do not prevent relapses. The 8-aminoquinolines act chiefly against exo-erythrocytic and sexual forms but are toxic. The newer drugs proguanil and pyrimethamine are cheap and lack toxicity and are most effective as suppressants. They also prevent transmission by acting on the developmental forms in the

mosquito. The drugs now available for treatment of malaria appear adequate. *J. D. Fulton*

HASKINS, W. T. **A Simple Qualitative Test for Chloroquine in Urine.** *Amer. J. Trop. Med. & Hyg.* 1958, Mar., v. 7, No. 2, 199–200.

The test described by BRODIE *et al.* for the estimation of organic bases [this *Bulletin*, 1947, v. 44, 793], which depends on salt formation with methyl orange, has been used in the present study. The reagents required are 10% sodium hydroxide, purified ethylene dichloride and a 0·1% solution of methyl orange in boric acid. To 5 ml. urine is added 1 ml. sodium hydroxide and 5 ml. ethylene dichloride, and the mixture is shaken for 1 minute, then centrifuged if necessary to separate the layers. The ethylene chloride layer is drawn into a clean test-tube and 0·5 ml. of the methyl orange solution is added. After shaking for 15 to 20 seconds the layers are separated. The presence of a non-specific yellow colour in the ethylene dichloride layer, absent in control sample of urine, is indicative of the presence of chloroquine. The colour is positive if 2 mgm. drug are present per litre, more definite at 5 mgm. per litre and intense at 10 mgm. per litre. A dose of 300 mgm. to white males gave rise to a positive test in the urine over a period of 10 days, which became negative by 12 days. In similar circumstances the test was negative throughout with a dose of 300 mgm. amodiaquine and with pyrimethamine after a 25 mgm. dose. *J. D. Fulton*

CHARLES, L. J. **Comparative Assessment of Chloroquine and Amodiaquine as Malaria Suppressive in Nigeria.** *Ann. Trop. Med. & Parasit.* 1958, Mar., v. 52, No. 1, 55–67, 2 figs. [27 refs.]

The two 4-aminoquinoline drugs, chloroquine and amodiaquine, are chemically very closely related; both are efficient therapeutic agents in acute malaria of all types, both are good suppressives, both have feeble gametocidal action in *P. falciparum* infections and neither is effective against the exo-erythrocytic phase of any species of plasmodium.

The author, observing the lack of information as to their relative merits when used in single doses to control parasitaemia among semi-immune persons in holoendemic areas, carried out a critical trial of both drugs at 3 dosage levels in children in Western Nigeria. The area chosen comprised a group of villages situated in the rain-forest zone 20 miles north-west of Lagos, where malarial transmission continues throughout the year with but slightly increased intensity during the rainy season. In this region, while *P. falciparum* infections predominate, *P. malariae* shows an incidence of 28–46% but is usually associated with *P. falciparum*; *P. ovale* appears at a low incidence—up to 9·5%—as a double or even triple infection with the other two; *P. vivax* does not occur.

The drugs were given to different groups in dosages of 300 mgm., 200

mgm. and 100 mgm. of the base respectively. Thick and thin blood films were taken immediately before administration, daily for the 3 days following and then at the end of each week after treatment up to 2 months. The films were stained with Giemsa stain. In addition to the 6 experimental groups, similar observations were carried out on a control group of 25 children to whom 25 mgm. ascorbic acid was given as a placebo.

Observations were made on 324 children whose average age was 6·65 years and who showed an incidence of hepatomegaly and splenomegaly of 27·5 and 78·4% respectively The mean parasite-density index was 3·59; *P. falciparum* infections were found in 97·2% and were combined with quartan infections in 30–50%, though the latter showed only a low parasite density. At all 3 dosage levels both drugs cleared the blood of all forms of parasite, excluding *P. falciparum* gametocytes, by the second week. The speed of clearance was directly related to the dosage given, ranging from 2·40 to 2·65 days in the case of chloroquine and from 2·02 to 2·85 days in the case of amodiaquine, for the 300 mgm. and the 100 mgm. dose respectively These results show no statistically significant differences between the efficiency of the two drugs. The speed of clearance was inversely related to the initial parasite density, this observation relating to *P. falciparum* infections only. Pre-segmental forms of *P. malariae* proved most resistant to each drug, persisting into even the second week, though their further development seemed to be inhibited. Parasitaemia made its reappearance first in the 100 mgm. amodiaquine group, during the 3rd week, but more slowly in the other groups, so that by the 8th week one-third, one-half and three-quarters of those treated with 300 mgm., 200 mgm. and 100 mgm. respectively were positive. Neither drug exerted a specific action on crescents, which slowly subsided to total extinction at 5½ weeks, after which they progressively reappeared. Weekly spleen rates showed a significant decline following a 300 mgm. dose of either drug, but had returned to their initial level by the 8th week. The incidence of hepatomegaly showed no variation throughout the course of the experiment. There was clearly no difference in susceptibility to reinfection between those with palpable splenomegaly and those without. Neither drug produced significant toxic effects.

The conclusion of greatest practical value is that in the case of *P. falciparum* infections a single 100 mgm. dose of either chloroquine or amodiaquine will clear the blood of parasites within 3 days and will keep it clear for about 3 weeks. As a consequence, the density of crescents will have declined almost to extinction at 4 weeks after treatment. [This represents for a semi-immune population a highly practicable form of drug prophylaxis, and one which is likely to break the cycle of malarial transmission at a cost within the means and by methods within the scope of most underdeveloped countries. The present cost of amodiaquine appears to be roughly double that of chloroquine.]

[See also Bruce-Chwatt and Archibald, 1953, v. 50, 477.]

J. H. Walters

Clyde, D. F. & Shute, G. T. **Comparative Trials of Tasteless Chloroquine Methylene-Hydroxynaphthoate and the Diphosphate Salts of Chloroquine among Tanganyika Schoolchildren.** *Ann. Trop. Med. & Parasit.* 1958, Mar., v. 52, No. 1, 51–4, 1 graph.

Chloroquine methylene-bis-β-hydroxynaphthoate, which is tasteless, has been shown to have an absorption in man about 90% of that of chloroquine diphosphate [this *Bulletin*, 1956, v. 53, 715], which is bitter to the taste. The authors carried out a trial on semi-immune Tanganyika schoolchildren, by the single-dose technique, to ascertain the relative efficiency of these two salts when given in equal doses of the base. The holoendemic area chosen lay in north-east Tanganyika and the experimental subjects were children aged 7–15 years with asymptomatic parasitaemia, in 98% due to *P. falciparum*, in 12% to *P. malariae*. The dosage schedules used were 0·075 gm., 0·15 gm., 0·225 gm., 0·30 gm., of base of either salt, while in the case of the hydroxynaphthoate salt 3 more groups were added, to which 0·375 gm., 0·45 gm. and 0·525 gm. were given. Blood films were examined 7 days after treatment.

A striking difference in efficiency was evident. While in the groups receiving chloroquine diphosphate the blood had been cleared of all asexual parasites of both species of malaria in every child of each dosage-group, in the groups receiving chloroquine hydroxynaphthoate asexual parasites of either species persisted in some subjects of each dosage-group up to the 0·45 gm. level, 0·525 gm. of the salt only proving sufficient to clear the blood of every child within the 7-day period. The diphosphate thus proved efficient in a dosage of one-sixth of that of the minimal effective dosage of the hydroxynaphthoate salt. The administration of an antacid simultaneously with the dose of chloroquine hydroxynaphthoate doubled the antimalarial efficiency of this salt. *J. H. Walters*

Clyde, D. F. **Radical Cure of Malaria in Premunes.** [Correspondence.] *Brit. Med. J.* 1958, May 24, 1238–9.

In an intensely malarious area it is difficult to know whether attacks in "premunized patients" who have undergone treatment previously are due to fresh infections or to relapse of uncured infections. An opportunity was taken of treating 92 African children in an area of Tanganyika where for the subsequent 6 months transmission was minimal. 96% were infected with *P. falciparum* and 16% with *P. malariae*. The treatment was chloroquine 0·225 gm. base with 50 mgm. pyrimethamine on 2 consecutive days. 6 months later, out of 81 of the children examined, 5 showed *P. falciparum* and none *P. malariae*; 16 of 41 untreated children showed one or both species of parasite. It is believed that the treatment did effect radical cure at least of *P. falciparum* infections; the 5 are thought to have been fresh infections, since low-grade transmission was continuing throughout. *B. B. Waddy*

Gelsi, R. & Lacroix, A. Sur un cas de déficience psychique d'origine palustre traité à l'hémochromatophénol d'Henry. [**A Case of Mental Deficiency of Malarial Origin treated with Henry's Haemochromatophenol**] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 40–42.

See this *Bulletin*, 1950, v. 47, (958).

i. Sergiev, P. G. & Rashina, M. G. [**The Results of Malaria Control in the U.S.S.R. and Future Problems**] *Med. Parasit. & Parasitic Dis.* Moscow. 1957, v. 26, No. 5, 520–31. [In Russian.]

ii. Pokrovsky, S. N. & Leizerman, L. J. [**Malaria Control in the R.S.F.S.R. following the Second World War (1946–1956)**] *Ibid.*, 575–8. [In Russian.]

iii. Rubinstein, B. B. [**On the Incidence of Malaria in the Bielorussian S.S.R.**] *Ibid.*, 592–4. [In Russian.]

Since the establishment of the Soviet Union, the medical and health authorities have been carrying out an extensive antimalarial campaign, with the ultimate object of eradicating this disease from the country. The three papers under review are devoted to accounts of the successful results obtained, as reflected in the striking decline in the incidence of malaria in the U.S.S.R.

i. On the occasion of the 40th anniversary of the revolution, the authors describe the results of the antimalarial campaign carried out in the Soviet Union up to 1957. It is pointed out that previously malaria was widespread throughout Russia, with an incidence of several million and a high mortality. However, the Soviet health authorities, aided by numerous research institutes and a network of sanitary-epidemiological stations, undertook the study and control of malaria on a large scale, with the result that by 1940 the incidence of this disease was lower than at any period in the history of the country. During the Second World War there was a deterioration in the epidemiological situation, resulting in an increased incidence of malaria, but after the war the campaign was resumed with renewed force. The period up to 1948 was devoted mainly to mass chemoprophylaxis and therapy, while the treatment of houses with DDT was carried out only on a small scale. However, since 1949 insecticides (DDT and BHC) have played a decisive role in the liquidation of malaria throughout the U.S.S.R., and the methods of drug prophylaxis were considerably improved, whereas chemotherapeutic treatment was gradually reduced. The success of the antimalarial campaign is largely due to the existence of more than 2,000 malaria stations, working in conjunction with sanitary-epidemiological stations, the personnel of which comprises about 2,000 medical malariologists, 500 entomologists and 350 hydrotechnical engineers.

The authors discuss the results of malaria control in the Soviet Union

since 1940 in great detail, with a number of tables. The following table can serve as a summary of the position from 1940 to 1956 inclusive, illustrating the remarkable success of the antimalarial campaign.

Incidence of malaria in U.S.S.R. and the various republics in 1940, 1946 and 1956:—

Republics	Incidence of Malaria					Reduction of malaria in 1956 compared with 1946 (per cent.)
	1940		1946	1956		
	In absolute figures	Per 10,000 population	In absolute figures	In absolute figures	Per 10,000 population	
USSR	3,164,522	—	3,517,199	—	0·6	99·60
Russian SSR	1,924,899	175·3	1,604,925	5,616	0·5	99·65
Ukrainian SSR ..	230,648	54·9	335,930	184	0·04	99·95
Bielorussian SSR ..	21,258	21·7	234,357	46	0·06	99·98
Azerbaidjan SSR ..	264,748	824·8	244,830	3,071	8·7	98·80
Georgian SSR ..	102,818	290·3	78,604	808	2·0	98·97
Armenian SSR ..	53,887	420·5	60,179	68	0·4	99·90
Uzbek SSR	203,552	324·0	348,282	645	0·74	99·80
Kazakh SSR ..	128,368	208·9	227,366	1,103	1·2	99·50
Tadjik SSR	72,224	486·3	80,020	1,305	7·3	98·40
Turkmenian SSR ..	27,237	217·2	29,361	58	0·34	99·80
Kirghiz SSR	18,927	129·7	52,412	69	0·34	99·90
Moldavian SSR ..	22,988	—	64,528	49	0·18	99·93
Lithuanian SSR ..	—	—	1,632	10	—	99·30
Latvian SSR	—	—	1,590	6	—	99·60
Estonian SSR ..	—	—	527	1	—	99·80

In conclusion, the authors express confidence that the introduction of the new Soviet drug, Chinocid [this *Bulletin*, 1956, v. 53, 17], which ensures a complete cure without relapses, will eventually bring about a complete eradication of malaria throughout the Soviet Union.

ii. The second paper deals with the incidence of malaria in the Russian Federated Republic (R.S.F.S.R.) during the post-war period (1946–1956), when—as the result of antimalarial measures outlined in the first paper—the incidence of this disease has been steadily dropping, until it has almost reached the point of extinction in some areas, though still remaining high in others, especially in the eastern part of European Russia and in Siberia. The changing picture is shown in the accompanying table.

Area	Incidence of malaria (per cent. of the total incidence in R.S.F.S.R.)				
	1940	1946	1953	1954	1955
Northern	1·5	0·7	0·5	0·2	0·2
Western	1·0	—	0·3	0·2	0·2
North-Western ..	1·0	2·1	1·8	5·6	0·7
Central	40	41	6·7	4·0	5·0
Volga-Kama	30	22	11·5	12·5	18·4
N. Caucasus	8·0	16	9·5	7·9	6·6
Urals	10	7	13·6	16·5	19·3
Western Siberia ..	6·0	7·7	41·6	40·6	30·2
Eastern Siberia	2·5	3·5	14·5	12·5	18·8
Far East	—	—	—	—	0·6

iii. In the last paper an account is given of the general fall in the incidence of malaria in the Bielorussian S.S.R., as the result of antimalarial campaigns. This trend was only interrupted during the 1944–46

period, as the result of an increase in the incidence of the disease owing to war conditions. The decline in incidence of malaria in this province is shown in table 1, while table 2 illustrates the same trend in the incidence of carrier cases.

TABLE 1

Year	Number of malaria patients	Year	Number of malaria patients
1923	7,321	1938	27,944
1924	11,336	1939	31,030
1925	16,548	1940	21,258
1926	7,828	1944	59,302 (for 6 months)
1927	9,227	1945	214,125
1928	15,237	1946	234,357
1929	5,924	1947	187,793
1930	3,101	1948	105,133
1931	2,178	1949	71,416
1932	3,172	1950	20,254
1933	6,344	1951	3,463
1934	25,966	1952	1,126

TABLE 2

Year	Number Examined	Number of malaria-carriers	
		In absolute figures	Per cent.
1949	747,868	10,663	1·42
1950	787,577	4,116	0·52
1951	583,887	495	0·09
1952	349,211	59	0·018
1953	180,310	7	0·004
1954	208,494	4	0·002
1955	99,257	6	0·0007
1956	103,805	1	0·0001

C. A. Hoare

HENTSCH, H. F. G. Bericht über die Malariabekämpfung mit Residualinsektiziden in Indonesien. [**Report on Malaria Control in Indonesia with Residual Insecticides**] *Zent. f. Bakt.* I. Abt. Orig. 1958, v. 171, Nos. 4/5, 336–41.

GAC. MÉD. DE MÉXICO. 1957, v. 87, Spec. No., 30 pp. Symposium sobre la Campaña de Erradicación del Paludismo, celebrado en la Academia Nacional de Medicina, el 17 de octubre de 1956. [**Symposium on the Campaign to Eradicate Malaria in Mexico**]

Readers of this *Bulletin* will be familiar with the organization set up to deal with the eradication of malaria in Mexico, and much of the material

in these papers has already been noted [this *Bulletin*, 1957, v. 54, 1157; 1958, v. 55, 371, 372].

The Symposium consists of 5 papers presented to the National Academy of Medicine in Mexico in October 1956.

In a brief introductory paper B. Sepúlveda, Vice-President of the Academy, refers to the magnitude of the problem and points out that the symposium was arranged at the direction of the President of the Academy, Dr. Montaño, because of the Academy's interest in the subject and desire to be associated with it.

Dr. I. Morones Prieto, Secretary of Health, describes the origins and organization of the National Commission for the Eradication of Malaria [*loc. cit.*].

Dr. M. Martínez Báez discusses the social and economic consequences of malaria in Mexico. He gives various calculations to show that the 2½ million cases and 25,000 deaths per year cost the country some $593 million—and this for a disease which is preventable. Apart from the human suffering and poverty incurred, the disease indirectly causes economic losses in such forms as reduced value of land in endemic areas, loss of investment capital, cost of turnover of labour, retarded education of children, lowered resistance to other diseases and a general feeling of apathy and frustration among those ailing people in affected areas who might otherwise be able to contribute to their prosperity. The author points out, wisely, that although health is necessary for a full life, it is not in itself a full life. It does, however, give the necessary vigour and stimulus to make life full. Control of malaria will not of itself cure social, economic and other ills: it will remove one of the major causes of inability to cure them. "*El paludismo es mucho más que una simple enfermedad: es un mal social.*"

Dr. M. B. Márquez Escobedo sets out briefly the basis of the programme for eradication of malaria, beginning with the antilarval service started in 1923. He sketches the history of the circumstances which led up to the present organization and describes the now familiar 4 stages in the process of eradication and their application in Mexico.

Finally, Dr. L. Vargas discusses modern insecticides and antimalarial drugs in the eradication campaign. He refers to the insecticides used and the indications for chemotherapy. The various forms of prophylaxis are described and a number of malariological definitions are given. The paper ends with a list of drugs and the stages and forms of the parasite against which they are used. *H. J. O'D. Burke-Gaffney*

Raffaele, G., Coluzzi, A. & de Zulueta, J. **Observations on the Effect of Numbers and Age on the Susceptibility of Mosquitos to DDT.** *Bull. World Health Organization.* Geneva. 1958, v. 18, No. 3, 464–8.

Tests of the effect of numbers and age of mosquitoes on their susceptibility to DDT were carried out by the standard Busvine-Nash method

[this *Bulletin*, 1953, v. 50, 1176; 1954. v. 51, 1028] and also by the authors' method [*ibid.*, 1957, v. 54, 925]. The important difference in the latter is that mosquitoes were exposed singly in suitable tubes to contact with the insecticide-treated filter papers. (It was not so important to keep them singly in the 24-hour observation period following the 1-hour exposure.) As regards effect of numbers, a table indicates that mortality of *Anopheles maculipennis atroparvus* (at 4% DDT concentration) is high (22·8% of 140 mosquitoes) if 5 mosquitoes are exposed in the same tube, but lower (15% and 2·5% of 80 and 40 mosquitoes) if, respectively, only 1 or 2 mosquitoes are exposed in a tube at a time. [Comparison of mortalities seems less convincing of a numerical effect when mosquitoes are exposed to 0·5, 1 and 2% DDT concentrations; figures given for controls—only for 1 and for 5 mosquitoes per exposure tube—seem in the table contradictory to the claim, which one might logically expect, of traumatic deaths with the larger numbers confined together. The text speaks, however, of the differences germane to the conclusion as being "significant".]

The effect of age is more clearly shown. A table shows that percentage mortalities were much greater for female *A. stephensi*, *A. m. atroparvus*, and *Aëdes aegypti* when they were older than 30 days (respectively 90, 45 and 46%) than when only 4 to 6 days old (36, 8 and 10%). This is confirmed for *A. m. atroparvus* at the usual 4 concentrations of DDT used in such tests. The strain used of this mosquito was less susceptible than is usually considered normal but this is thought to be, probably, some effect on its vigour over 20 years of laboratory rearing. *D. S. Bertram*

TRYPANOSOMIASIS

In this section abstracts are arranged as far as possible in the following order:—African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:*—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

i. Jewell, G. R. **Detection of Tsetse Fly at Night.** [Correspondence.] *Nature*. 1958, May 10, v. 181, 1354.

ii. Rennison, B. D., Lumsden, W. H. R. & Webb, C. J. **Use of Reflecting Paints for locating Tsetse Fly at Night.** *Ibid.*, 1354-5.

i. These notes report for *Glossina swynnertoni* and *G. pallidipes* that tsetse fly rest on the leaves of bush and trees at night, though day-time resting places are usually on the boles and branches. The first paper

reports use of the fluorescence in ultra-violet light of spots of certain paints applied to the tsetse fly [this *Bulletin*, 1957, v. 54, 138].

ii. The second paper develops a method of applying to the tsetse thorax a spot of microscopic glass beads bound in a thin shellac-alcohol base or gum acacia solution plus some Teepol. This, as in modern road signs, reflects ordinary light from a hand torch. A distance of 9 metres between the observer with torch (at eye level) and the bush gave best results in reflection. 9 tsetse were located out of 56 marked in about half-an-hour. Since some were 20 metres from the release point, the remainder may have dispersed beyond the searched area. The method, it is thought, might be useful with other insects, even mosquitoes. It dispenses with the need for ultra-violet light equipment, and seems equally promising as a marking method. *D. S. Bertram*

Radermecker, J. Corrélations électro-cliniques dans la trypanosomiase humaine africaine et dans la trypanosomose employée comme thérapeutique des affections psychiatriques graves. [**Electroencephalographic and Clinical Correlations in African Trypanosomiasis and in a Therapeutic Trypanosome Infection used for a Severe Psychiatric State**] Reprinted from *Acta Neurologica et Psychiatrica Belgica*. 1955, No. 2, 179–218, 20 figs.

The author has taken an opportunity for making clinical and electroencephalographic studies on 10 patients with naturally-acquired African sleeping sickness [*Trypanosoma gambiense*] and on one paranoic patient artificially infected by inoculation with a strain of *T. gambiense* obtained from a guineapig. He records the history and the findings in each case in considerable detail. and considers that his observations verify conclusions already reached by other French workers [*e.g.*, this *Bulletin*, 1953, v. 50, 488] on the development of EEG changes in human trypanosomiasis and their relationship to the clinical picture of the disease. The paper should be consulted in the original by those interested. *A. R. D. Adams*

Janssen, P., van Bogaert, L. & Haymaker, W. **Pathology of the Peripheral Nervous System in African Trypanosomiasis. A Study of Seven Cases.** Reprinted from *J. Neuropath. & Exper. Neurol.* 1956, July, v. 15, No. 3, 269–87, 8 figs. [18 refs.]

The literature on human African trypanosomiasis contains little information on the pathological changes in the peripheral nervous system caused by this disease. Such material from 7 Africans dying of *Trypanosoma gambiense* infection in the Belgian Congo has particularly been studied by the authors. There are detailed reports of each patient, and of the material available for study from each. From only one was an actual peripheral nerve trunk available and this was not named, but from all

there were some cranial nerves and spinal roots. One patient only was known to have suffered clinically from an undoubted polyneuritis, but on the autopsy evidence it seemed highly likely that the others must have suffered similar episodes. Changes ranging from minor degeneration of the Gombault-Stransky type to major Wallerian degeneration were evident in all cases. The Wallerian degeneration occurred not only in the nerve bundles but more especially in or near the Gasserian and dorsal root ganglia. Degeneration of nerve cells in these ganglia was considered to be secondary to the nerve fibre destruction, and both anterior and posterior nerve roots were affected. Interstitial neuritis was usual and was found in association with an exudate consisting of plasma cells and Mott's morula cells. There was a marked vasculitis, especially in the perineurium, and there was some proliferation of the vascular endothelial cells. The neuritis was characterized by the differing ages of the lesions, some being recent and others old, and by the presence of many morula cells. The periodic liberation of endotoxin from parasites destroyed during repeated trypanolytic crises, it is suggested, would account for these lesions. *A. R. D. Adams*

Thurston, June P. **The Oxygen Uptake of** *Trypanosoma lewisi* **and** *Trypanosoma equiperdum*, **with especial Reference to Oxygen Consumption in the Presence of Amino-Acids.** *Parasitology*. 1958, May, v. 48, Nos. 1/2, 149–64, 7 figs. [17 refs.]

Thurston, June P. **The Effect of some Metabolic Inhibitors on the Oxygen Uptake of** *Trypanosoma lewisi* **and** *Trypanosoma equiperdum*. *Parasitology*. 1958, May, v. 48, Nos. 1/2, 165–83, 14 figs. [14 refs.]

Peñalver, L. M.; Rodriguez, Maria I.; Sancho, G. Trypanosomiasis humana en El Salvador. Reporte preliminar. I Parte. Investigaciones epidemiologicas. [**Human Trypanosomiasis in El Salvador. A Preliminary Report. I. Epidemiological Studies**] [Peñalver, Rodriguez & Sancho]. *Archivos Colegio Med. El Salvador*. 1956, Sept., v. 9, No. 3, 167–84, 5 figs. [53 refs.] II Parte. Aspecto cardiovascular. [**II. Cardiovascular Aspect**] [Rodriguez & Peñalver]. *Ibid.*, 185–206, 13 figs. [34 refs.]

i. Although Salvador was the second Latin-American country in which Chagas's disease was reported (in 1913) comparatively few studies have been reported in that country. The authors review briefly the history of the disease in Salvador and neighbouring countries. They then describe

a Commission, with the senior author as President, which was formed to study the problem and in which official and private medical workers participated. Those bodies taking part included the Tropical Institute and the Medical Faculty of the University; the Cardiology Department and the laboratory of the Hospital Rosales; and the Ministry of Public Health and Social Assistance. Since many of the participants devoted their spare time to the work, it is remarkable that between March and September 1955 they were able to produce this very full preliminary report for submission to the National Medical Congress held in San Salvador in November of that year—an admirable example of medical cooperation.

The investigation embraced every aspect of the disease. The report begins with an account of 1,763 triatomid bugs collected from different parts of the country, and these are listed in detail. Two species were found, *Rhodnius prolixus* and *Triatoma dimidiata*. Indices of infection are tabulated separately for 29 towns in 11 departments. Of 1,471 bugs examined, 20·5% were positive, 13·5% with *Trypanosoma cruzi*, 5·3% with *T. rangeli* and 1·7% with both. For the first time in Salvador, *T. rangeli* was reported in *R. prolixus*.

Clinical investigations were made of healthy persons in various localities, of patients with presumed Chagas's disease who were attending the Cardiology Department of the Hospital Rosales and of patients from various other units and from private practitioners. Diagnosis was made from thick blood films, by culture and by xenodiagnosis. In this way, 31 cases of Chagas's disease were detected, 23 due to *T. cruzi*, 4 to *T. rangeli* and 4 to a mixed infection. This is the first time that cases due solely to *T. rangeli* had been found in Salvador. 3 of the 4 patients were children aged 2, 7 and 10 years and 1 was a woman of 25. The 31 patients came from different parts of the country and the proportion having cardiac lesions was high.

The authors stress the importance of Chagas's disease as a public health problem in Salvador. It was found throughout the country, both in rural and urban areas, except at high altitudes. Every effort should be made to look out for the disease, especially in hospital patients, and the authors recommend that the health authorities should undertake prophylactic measures for the control of this widespread infection.

ii. Hitherto there have been few records of cardiac complications of Chagas's disease in Salvador. The authors now report a detailed study of 15 parasitologically proved cases of the disease from the Hospital Rosales and this is accompanied by numerous skiagrams and electrocardiographic tracings. The details of these changes should be sought in the original.

The first group included 5 patients in the acute stage who had presented with the ophthalmo-glandular complex which had followed the bite of the bug. A sixth patient in this group was classified as being in the subacute stage. He had shown the characteristic features 6 months earlier, but they were absent at the time of examination; probably this was a case of repeated re-infection. The first 5 patients were aged 2½ to 28 years.

Only 1 had an enlarged heart. 4 had tachycardia and in only 1 patient was the electrocardiographic picture normal.

Oral administration of primaquine diphosphate resulted in disappearance of the parasites in all but 1, in whom, although *T. cruzi* disappeared, *T. rangeli* was found. This parasite was probably missed at the first examination. The question is posed whether *T. rangeli* is little affected by primaquine. The authors do not feel justified as yet in concluding whether the treatment of other patients, while encouraging, constitutes a complete cure.

There were 9 chronic cases, which showed various degrees of cardiac dysfunction. 7 of the patients clinically fulfilled the criteria of chronic myocarditis of Chagas's disease as described by other authors. The last 2 were clinically diagnosed respectively as tuberculous pericarditis with hyperthyroidism and constrictive pericarditis. Specific treatment with primaquine was given to all patients, but it is considered premature to draw any conclusions; neither were the results with certain cardiac drugs conclusive.

Heart disease is frequently encountered in the Hospital Rosales. That a number of these cases are to be attributed to Chagas's disease is evident, particularly those in children during the acute stage. The importance of chronic heart disease and the need for further study of the mechanism involved are stressed. *H. J. O'D. Burke-Gaffney*

Nussenzweig, V. & Faria, R. Prova da antiglobulina no diagnóstico da doença de Chagas na fase crônica. [**Antiglobulin Test for the Diagnosis of Chronic Chagas's Disease**] *Hospital*. Rio de Janeiro. 1955, June, v. 47, No. 6, 701–10. [13 refs.] English summary.

The authors describe the application of the Coombs antiglobulin test for the diagnosis of Chagas's disease. The sera of persons suspected to be suffering from this disease were first inactivated for half an hour at 56°C., after which heterophile antibodies were absorbed with sheep erythrocytes for 12 hours in the refrigerator. Finally the sera were decanted and preserved at −25°C. Antigen was made with washed cultures of *Trypanosoma cruzi* suspended in 2% saline. Human antiglobulin serum was prepared by intramuscular injections of rabbits with progressively increasing doses of fresh serum belonging to group O. Since antiglobulin serum agglutinates the trypanosomes it was previously absorbed by addition of these flagellates.

The diagnostic procedure was as follows: 0·1 ml. of suspected serum was mixed with 0·4 ml. of trypanosome suspension, and incubated for 1 hour at 37°C., after which saline was added and the mixture was centrifuged and washed repeatedly; finally, one drop of concentrated trypanosome suspension was mixed on a slide with a drop of previously absorbed and titrated antiglobulin serum. In positive cases there was an

immediate and strong reaction in the form of large clumps of agglutinated trypanosomes.

There was a close agreement between this test and the complement-fixation test, used for comparison. On the other hand, negative results were obtained with the great majority of sera from persons not suffering from trypanosomiasis. The need to use living trypanosomes for the antigen makes it difficult to use this test for routine purposes.

C. A. Hoare

Noetzel, H., Elejalde, P. & Dias, E. Über die Gehirnveränderungen bei der Chagaskrankheit. [**Cerebral Changes in Chagas's Disease**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1958, v. 9, No. 1, 27–32, 5 figs.

A child of 11 months had swelling of the face, especially in the region of the right eye, 8 days before admission to the clinic; 4 days later the eyes were closed with oedema of the lids, and there was fever, cough and vomiting. On admission, temperature was 38°C., and the pulse 128 beats per minute; there were light crepitations over both lungs. The spleen was greatly enlarged, but the liver was not notably enlarged. In addition to severe palpebral oedema there were palpable axillary, supra-clavicular and maxillary glands. *Trypanosoma cruzi* were present in the blood (8 to the field). After a further 8 days convulsions developed, with squint, but no paralysis. The child died from pulmonary oedema and heart failure 16 days after the onset of clinical signs.

At autopsy there was general skin oedema especially in the right eyelids. Liver and spleen were grossly enlarged. There was general lymph node enlargement. There was no fluid in the body spaces.

The brain weighed 770 gm. Vessels of the meninges were injected with a few small haemorrhages. Apart from a few petechiae in the substance of the left cerebellum, there were no gross changes in the brain. Histologically, the meninges were little involved, with some mild swelling of the arachnoid, a few free lymphocytes and no parasites.

Under the loupe there were many scattered small nodules in the substance and cortex of the fore brain, the cerebellum and the brain stem. These nodules varied in size, were mostly in relation to blood vessels (precapillaries and capillaries). The larger nodules were composed of microglial conglomerations with some monocytes; leucocytes were rare. The boundaries merged vaguely into the surrounding tissues. Neighbouring ganglionic cells were displaced; some were damaged. The axon cylinders were broken up or difficult to trace through the nodules. The smaller lesions were composed of microglial cells, sometimes a single degenerate cell surrounded by others. Parasites were not always present. In the cytoplasm of the damaged cells parasites were sometimes included and always in the leishmania form. Similar forms were free in the tissues. Mature parasites were not seen.

There was no special site for nodule formation. Some cuffing of vessels was present, and the endothelial cells were sometimes swollen and degenerate and contained leishmanoid parasites. There was some isolated diapedesis of erythrocytes.

The lesions observed are compared with those described in the literature. The usual description is that of a nodular encephalitis. In severe infections there may also be perivascular infiltration and meningeal involvement, producing a diffuse meningoencephalitis. Diagnosis thus depends more on the discovery of the organism in the blood or tissue sections than on the histological picture *B. G. Maegraith*

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

Sadikario, A. & Tadžer, I. S. **Bone Marrow in Hypersplenic Children (Kala-Azar and Metamalaric Hypersplenism).** *Acta Facultatis Med. Skopiensis.* Skopje. 1957, v. 4, 121–4.

"Bone marrow in 60 hypersplenic infants and children shows a particular morphological aspect:

"Intensive increase of late and intermediate erythroblasts, without pronounced maturation arrest, relative suppression of white cells and megacaryocytes, and obvious decrease of lymphocytes and often of reticulum cells."

Nussenzweig, V. Reação de fixação do complemento para leishmaniose visceral com antígeno extraído do bacilo da tuberculose. Técnica, sensibilidade e especificidade. [**Complement-Fixation Test for Visceral Leishmaniasis with** *Myco. tuberculosis* **Antigen. Technique, Sensitivity and Specificity**] *Hospital.* Rio de Janeiro. 1957, Feb., v. 51, No. 2, 217–26. [27 refs.] English summary.

Description is given of a complement-fixation test for South American kala azar, in which aqueous extracts of tubercle bacilli (previously dried in acetone) were used as antigen. The reaction proved to be very sensitive, for it was positive—with high titres—with the sera of 64 cases of human kala azar, whereas only about half of those which were also tested by Napier's method reacted. However the reaction is not specific for visceral leishmaniasis, since positive results were also obtained with sera from cases of tuberculosis, leprosy and cutaneous leishmaniasis, as well as from cases of Chagas's disease. *C. A. Hoare*

Nussenzweig, V., Nussenzweig, Ruth S. & de Alencar, J. E. Leishmaniose visceral canina: reação de fixação do complemento com antigeno extraído do bacilo da tuberculose. [**Complement-Fixation Test for Canine Visceral Leishmaniasis with** *Myco. tuberculosis* **Antigen**] *Hospital.* Rio de Janeiro. 1957, Mar., v. 51, No. 3, 325–32. English summary.

The authors found that the complement-fixation test, with antigen prepared from tubercle bacilli [see above], was far more sensitive for the diagnosis of South American canine visceral leishmaniasis than other methods commonly used, *viz.*, skin or liver biopsy. The test was positive at high titres with the sera of 31 dogs in which parasites had already been detected, but it was negative in 65 out of 67 dogs from S. Paulo, where both human and canine kala azar are absent. The authors believe that this test " may contribute decisively to the knowledge of the epidemiology of canine leishmaniasis ". *C. A. Hoare*

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

Price, W. H., Emerson, Hope, Nagel, H., Blumberg, R. & Talmadge, Susan. **Ecologic Studies on the Interepidemic Survival of Louse-Borne Epidemic Typhus Fever.** *Amer. J. Hyg.* 1958, Mar., v. 67, No. 2, 154–78. [43 refs.]

This paper presents further evidence on the ability of man to serve as an interepidemic reservoir of *Rickettsia prowazeki*. It had previously been reported [this *Bulletin*. 1955. v. 52, 621] that isolations of *R. prowazeki* were made from inguinal lymph nodes removed from 2 out of 31 apparently healthy persons whose sera showed low titres of complement-fixing (CF) antibodies for this organism. Both persons had come to the United States from Russia, one 28 years and the other 42 years previously. There was no evidence that either had been exposed to *R. prowazeki* in recent years. Another isolation of *R. prowazeki* was made by inoculating cotton rats with blood from a woman diagnosed as having Brill's disease. She had lived in the United States for 17 years. Her serum had shown a CF antibody titre of 1 in 20 for *R. prowazeki* about 22 days previously, but a sample taken 4 days before the animal inoculation had no detectable CF or neutralizing antibody titre. Rats were inoculated with her blood when she complained of headache and malaise with slight fever, her serum on this day having a CF antibody titre of 1 in 10. After 11 days the CF titre was 1 in 1,280.

CF and neutralization tests on the sera of 1,708 persons who had come to the United States from eastern and south-eastern Europe at least 25 years previously gave results indicating that at least 30% had experienced typhus infection. Of 201 children born in the United States, who had a parent with CF antibody for *R. prowazeki*, none showed serological evidence of typhus infection; sera from 481 adults born in the United States also gave negative tests. 308 persons with CF antibodies for *R. prowazeki* maintained fairly constant titres over a 3-year period, except for 8 whose antibodies became undetectable for at least 1 year.

The characteristics of 2 strains of *R. mooseri* remained unchanged after 38 and 89 passages in rhesus monkeys and *Pediculus humanus corporis*.

Attempts were made to transform *R. prowazeki* to *R. mooseri* by inoculating Swiss mice intraperitoneally with 10^7 *R. prowazeki* together with the supernatant fluid from centrifuged preparations of sonically-disintegrated *R. mooseri*. In 3 out of 21 such attempts strains of rickettsiae were obtained which showed all the properties of *R. mooseri* (serological, effect on *P. humanus corporis*, growth in mice and guinea-pigs); this apparent transformation did not occur when the *R. mooseri* extracts used in the 3 successful attempts were treated with desoxyribonuclease.

It is thought that the activation of latent typhus infections in man requires some unknown factor in addition to an upset of the antibody-forming mechanism. The 2 isolations of *R. prowazeki* from healthy individuals are regarded as " the last link in the chain of evidence needed to fulfill Zinsser's hypothesis that man may act as an interepidemic reservoir of *R. prowazeki* ".

[This paper is of notable interest. For an account of a paper by Reiss-Gutfreund reporting the isolation of *R. prowazeki* from domestic animals and their ticks in Ethiopia, see this *Bulletin*, 1957, v. 54, 801.]

R. S. F. Hennessey

Combiesco, D. *et al.* Le typhus exanthématique épidémique. Caractères cliniques et épidémiologiques. Diagnostic de laboratoire et étude expérimentale du typhus exanthématique épidémique actuel. Ier Mémoire. Clinique du typhus exanthématique épidémique actuel. [**Clinical Features of Epidemic Typhus in its Current Form**] *Arch. Roumaines Path. Exper. et Microbiol.* 1957, June, v. 16, No. 2, 185–210, 9 graphs. [15 refs.]

Cases of typhus from the Suceava region, Rumania, included 50 relapses and 79 primary attacks.

In half the former the onset was insidious; in the others it was abrupt. Symptoms in the insidious group included headache, asthenia, lumbar and limb pains. The patients continued working until they sought medical help. In those with abrupt onset headache, fever and shivering,

asthenia, anorexia and generalized pains were common. Many attended clinics on foot.

Fever was irregular and remittent and lasted 4 to 14 days from the onset (mean of 9·3 days) and ranged about 38 to 39°C. It subsided more often by lysis than crisis. Rash appeared in two-thirds of the patients and half of these had petechiae. One had purpura. The general condition of the patients was good. Most had hyperaemic conjunctivae, some with photophobia. About one-quarter were mildly prostrated or dehydrated. Typical tongue changes were seen in one-third. Anorexia, abdominal pain, nausea and vomiting also occurred. The spleen was palpable in one-third and the liver slightly less frequently. There were no pronounced cardiovascular or pulmonary signs and symptoms. Proteinuria was present in 26%. Headache was common (94%) and violent. A few had neurological signs including mild delirium or stupor. Reflexes were unchanged. There were no complications or deaths.

White blood cell counts varied from normal (two-thirds) to leucopenia (11%). The mean erythrocyte count was 3·5 million cells per cmm. The erythrocyte sedimentation rate was commonly raised. The cell content of the cerebrospinal fluid was slightly raised (4 to 83 cells per cmm.) as was the protein.

In 19% of patients the Weil Felix reaction was positive in a titre of 1 in 500. Complement fixation (*Rickettsia prowazeki* antigen) was positive in 100%.

Treatment was symptomatic.

In the primary infections cases appeared both in epidemic foci and sporadically. The incubation period was about 14 days (maximum 21 days). Onset in half was acute with sudden rise of temperature and shivering, violent headache (especially frontal and constricting), muscular pains, hyperaemic conjunctivae and sometimes pharyngeal enanthema. There was some anorexia, nausea, vomiting and diarrhoea. The symptoms were never of " typical severity ". Insidious onset was common in children and in epidemic cases. There was milder headache, fatigue, and increasing fever. The fever lasted 4 to 16 days (mean 11·6 days). It was remittent, varying between 39–40°C. by 0·5 to 1·0°C. daily. It fell equally by lysis or crisis. The macular rash was absent in 21%; otherwise it had appeared by the sixth day. Petechiae occurred in 60%. Sites of selection were the thorax, flanks and anterior aspects of the limbs.

General symptoms were much as in the relapse group, except that mild cardiovascular signs, including tachycardia and hypotension were more common. Collapse occasionally developed. There was no gangrene.

One patient developed pneumonic complications, 2 others had cold cyanosis.

The Weil Felix reaction was positive to a titre of 1 in 500 to 1 in 10,000 in 61% and the complement-fixation test in 100%.

All patients recovered with symptomatic treatment.

The authors conclude that recent cases of epidemic typhus in the region of Suceava are milder in most respects than those reported in previous epidemics. Similar modification of the clinical picture has been reported from other areas. Improved nutrition may be a significant factor. *B. G. Maegraith*

Castorina, S. La compromissione dell'apparato cardiovascolare nelle Rickettsiosi. [**Cardiovascular Involvement in Rickettsial Disease**] *Acta Med. Italica.* 1957, Dec., v. 12, No. 12, 401–11, 1 fig. [16 refs.]

Roger, F. & Roger, Annie. Un Phénomène d'allergie pulmonaire spécifique chez le lapin avec *Rickettsia prowazcki.* [**A Specific Pulmonary Allergic Phenomenon in Rabbits infected with** *Rickettsiae prowazeki*] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 31–2.

A temporary shortage of new rabbits caused the authors to consider whether they should have to attempt to use their stock of immune rabbits for the preparation of *Rickettsia prowazeki* antigen. This did not, in fact, arise, but in the course of preliminary experiments they noted that these rabbits gave a positive intradermal test and their sera agglutinated the homologous organism to a titre of 1 in 1,280.

They have already referred to their experience in cultivating rickettsiae in animal lungs, and to the relatively low immunity to rickettsiae of the pulmonary epithelium [this *Bulletin*, 1957, v. 54, 20]. In the present experiments, they were struck by the fact that the lungs of immune rabbits were 2 to 3 times as heavy as those of new rabbits. Thus, it appeared that specific hypersensitivity to rickettsiae was detectable not only in the skin but in the respiratory tract. They state that this is the first example known to them of a visceral pathological process which, in the case of rickettsiae, is linked to a specific allergic mechanism.

H. J. O'D. Burke-Gaffney

Smith, W. W. **Rat, Flea, and Murine Typhus Recurrence following Eradication Measures.** *Pub. Health Rep.* Wash. 1958, May, v. 73, No. 5, 469–73.

"During a 10-month operational period, an attempt was made to eradicate murine typhus fever from the rural endemic foci in the southeastern quarter of Grady County, Ga. Intensive rat poisoning and applications of 10 percent DDT dust to rat-infested farm premises were the chief eradication measures used.

"Four extensive inspections were made within the area after eradication measures ceased on May 4, 1954. A preliminary inspection made

within 2 months after the eradication program ended indicated reinfestation of 5·2 percent of the farms nearest to those where rats were not completely eradicated. More complete inspections of the farms in the eradication area at intervals of 1, 2, and 3 years after eradication showed that rats had reinfested 29·4, 33, and 41·7 percent of the farms from which rats had been cleared.

"Typhus antibodies were found in 3 of 70 rats trapped in the area immediately after the eradication program. At the end of 1 year, the 1 rat with typhus antibodies among 139 rats trapped was believed to have emigrated from adjoining untreated territory. Four rats of a total of 142 trapped at the end of the second year had antibodies to typhus, while none of 148 rats taken at the end of the third year revealed typhus antibodies. No human cases of murine typhus are known to have occurred in the experimental area since the cessation of operational procedures on May 4, 1954."

[See this *Bulletin*, 1957, v. 54, 1066.]

Ito, T., Obata, Y. & Ono, M. **Eggs of Dragon-Fly as New Food for Trombiculid Mites.** *Acta Med. et Biologica.* Niigata. 1957. Dec., v. 5, No. 3, 169–99, 6 figs. on pl. [29 refs.]

The life cycles of *Trombicula akamushi*, *T. intermedia* and *T. pallida* have been completed by using dragon-fly eggs to feed the non-parasitic nymphs and adults. The dragon-fly (*Sympetrum frequens*) eggs, expressed from the abdomen of females caught at dawn and dusk at rest on vegetation beside rice fields, were acceptable to trombiculids up to at least 5 months after freezing at −3°C. Some general cultures of numerous mites were kept, besides isolated specimens. Much detail, by text and tables, is presented. The amount of egg substance ingested directly affects the egg yield per adult. In general cultures with *T. akamushi*, 678 gorged larvae (from field voles) yielded 363 adults in periods of 26–70 days. Oviposition started 31 to 58 days after the emergence of the adults. A culture of 50 unsexed adults, and another of 62, produced 6,744 and 11,937 eggs, respectively, in 63 to 97 days. Isolated females produced widely different numbers of eggs, varying from 2 to 29 eggs per day and extending from 13 to 24 days. An average seems to be 100 eggs in about 3 weeks. (On dragon-fly-egg diet the life cycle was completed in 52–53 days.) Laboratory-bred larvae became engorged in 2 days on white rats; adults were obtained 26 days later. These produced eggs 11–12 days later which hatched in 13 days. These times were obtained at 28°–32°C. There was no evidence of parthenogenetic reproduction. Eggs laid later by a female hatch less successfully than her earlier eggs. Eggs can hatch at 18°C., consistent with spring hatchings in nature, but after 10 days at −3°C. or 94 days deep in soil under 30 cm. thickness of snow outdoors no hatching occurred when the eggs were returned to 28°C.

Brief reference to behaviour states that, at 22°C., unfed larvae "attempted to escape" by violent rolling and turning and jumping when a person was at 2 cm. distance. In contrast, on another occasion, they "jumped up" at a brush held in the operator's hand as high as 4 cm. This is said to prove a visual response with their eyes, in addition to other sensory perceptions reported by others [see this *Bulletin*, 1958, v. 55, 143 and 385]. [It is difficult to conceive why unfed larvae should evince both a strong escape reaction and a vigorous attraction to essentially the same stimulus (apparently the operator). It is difficult to exclude a rather exaggerated attraction-response, in both cases, to the carbon-dioxide emitted by the operator. The data are not sufficient to judge the matter; but they are also not adequate to justify the conflicting conclusions and the suggestion of a visual response.] At 28°C. and 90% relative humidity, the first of 100 larvae died in 20 days and all were dead in 90 days.

Somewhat similar data are given for *T. intermedia* and *T. pallida*, and, in the introduction and the discussion, work of others in rearing trombiculid species is considered. The present method failed with *T. japonica*.

D. S. Bertram

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i. Bourlaud, J. Syndromes pseudo-grippaux de type épidémique observés aux Kerguélen chez des Européens au cours de l'hiver et du printemps austral. Résistance des Comoriens. [**Epidemic Type of Pseudo-Influenzal Syndrome in the Kerguelen Islands in the Winter and Spring and Limited to Europeans**] *Bull. Soc. Path. Exot.* 1957, Nov.–Dec., v. 50, No. 6, 870–74. Discussion 874–6.

ii. Giroud, P., Pfister, R. & Dulac, P. A propos d'une épidémie de fièvre Q aux Iles Kerguelen. Le problème du diagnostic rétrospectif. [**Retrospective Diagnosis of an Epidemic of Q Fever in the Kerguelen Islands**] *Ibid.*, 877–8.

i. The population of the base on the Kerguelen islands, Indian Ocean, from May 1956 to May 1957 was for the first 6 months 45 men, subsequently 94 men and 2 women. The men were in the age-group 20–40 and in good health. Twice a year a ship called from Madagascar and unloaded cattle, sheep and pigs for the island farms; there were also occasional Russian or Australian ships. Fauna of the island includes rabbits introduced 100 years ago and various birds and a relatively little known arthropod population. Migrating sea birds are especially numerous in spring and summer during the nesting season; they never completely disappear even in winter. *Ixodes* and *Sarcoptes* have been recovered from these birds.

In May 1956 to February 1957 two probably identical epidemics struck the base population, one after the other. In the first, during the winter, there were 15 cases; in the second, during December and January, there were 43. All except 3 patients were visiting Europeans.

The clinical picture was as follows: After a day or two of prodomata, the temperature rose rapidly with rigor, then gradually reached a remittent plateau of up to 40°C. In 2 to 5 days there was a rapid fall of temperature with sweating. In some cases the temperature fell to normal in 2 to 3 days. More often it rose again in the evenings. A second phase followed in which the symptoms were less severe and the fever lower and swinging. The temperature eventually fell to normal by lysis with sweating.

There was some dissociation of temperature and pulse. The patient was disorientated and had severe headache, retro-ocular pain and photophobia. There was generalized muscular pain. The face was flushed, conjunctivae slightly injected. In 2 patients there was a fugitive rash. Physical examination revealed little. There was no albuminuria. Blood lymphocytes and monocytes were increased. Convalescence was slow with occasional fever, digestive disturbances and epistaxis.

Three groups of patients were identified. One as above; one with attenuated symptoms; one patient had a long period of fever, followed by 10 days' apyrexia, then a second bout of fever.

Antibiotics were ineffective.

A similar case had developed in April 1956, three weeks before the epidemic, and 2 others (more doubtful) in May and October 1955.

The diagnosis is discussed. Influenza could be discounted. Dengue and *Phlebotomus* fever were possible; vectors may have been imported from Madagascar, but none were found. No malaria parasites were found. *Salmonella* infections were considered unlikely. No spirochaetes were found in the blood.

The author suggests that the epidemic was viral, possibly associated with local vectors and animals local or imported. Examination in November 1957 of the blood of a patient who had been ill in July 1956, showed an agglutination of 1 in 20 to *Rickettsia burneti*. The possibility of Q fever must therefore be considered. Certain points are made. For instance, imported sheep were possibly involved; the island farm was near the favourite walks of the population; forage and straw came from Madagascar.

The author checked the diagnosis by examining the blood from 9 of those involved in the outbreak. Of 9 subjects, the serum of 4 agglutinated *R. burneti* at 1 in 20.

In the discussion which followed the paper M. G. Marinesco pointed out that the usual form of Q fever was associated with pneumonic symptoms. The pseudo-influenzal type described in Kerguelen resembled an infection called " Balkan influenza " in German troops in their Greek campaign.

Other atypical forms of Q fever, including the vascular and neurological, were described by F. Roger and A. Roger.

ii. The authors summarize the history of the Kerguelen outbreaks. More than 40 people were affected one to two months after the arrival of

the (Madagascar) ship in November 1956. The agglutination reactions to *Rickettsia burneti* in the sera of 9 persons previously involved in the epidemic are discussed. 4 agglutinated at 1 in 20, which is regarded as a significant titre. Referring to the appearance of agglutination, the authors state that early in the disease and again after several months, agglutination of the suspension occurs only at the periphery of the drop; only towards the thirtieth day, when antibodies reach their maximum, does the agglutination spread over the whole field. Presumably in the former type of reaction, the antibody is concentrated at the periphery. There may be a similar explanation for the zonal inhibitions of cultures.

B. G. Maegraith

Roger, F., Giuntini, J. & Roger, A. Affinités tinctoriales des rickettsies. IV.—Colorabilité de *Rickettsia burneti* après agitation en présence d'éther. [**Staining Affinities of Rickettsiae. IV.—Colourability of *R. burneti* after stirring in the Presence of Ether**] *Ann. Inst. Pasteur.* 1958, May, v. 94, No. 5, 663–6, 6 figs. on pl.

Suspensions of *Rickettsia burneti* which had been extracted with ether retained their ability to be stained with methylene blue, but about 97% of rickettsiae did not stain with eosin and had a greatly reduced affinity for fuchsin. Electron micrographs showed that in addition to changes in the cell-membrane, the cytoplasm of the majority of ether-treated rickettsiae was much less homogeneous than that of untreated organisms. The antigenicity and serological reactivity of ether-treated rickettsiae remained high. Ether extraction may remove lipid material which is concerned with the eosin and fuchsin staining reactions.

R. S. F. Hennessey

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

i. Bejarano, J. F. R. Estado actual del conocimento sobre la existencia de fiebre amarilla y sobre la lucha antiamarílica en la República Argentina. [**Present Knowledge of the Existence of Yellow Fever and its Control in Argentina**] *Rev. Sanidad Milit. Argentina.* 1956, Apr.–June, v. 55, No. 2, 129–64, 17 maps (1 folding). [Numerous refs.]

ii. Bejarano, J. F. R. Mosquitos posibles transmisores del virus amarílico en la República Argentina. [**Possible Vector Mosquitoes of Yellow Fever in Argentina**] *Ibid.*, July–Sept., v. 55, No. 3, 281–341, 4 maps, 1 graph & 6 figs. [129 refs.]

i. This paper assembles facts indicating the existence of jungle yellow fever, transmitted by *Haemagogus* and non-domestic *Aëdes*, in Argentina and of its occurrence in man under appropriate conditions of suitable exposure to the bites of such mosquitoes. Legislation has been completed for the organization of the eradication of *Aëdes aegypti* from the country, vaccination of people at risk to infection, and extensive studies of the distribution and the pathogenicity of jungle yellow fever transmitted by non-domestic mosquitoes. The conclusions put forward are recognized as extending the range of yellow fever distribution in South America to 31°20′ south. A substantial body of fact on the several aspects of evidence involved includes several tables and numerous maps.

ii. This paper follows logically on the previous one referred to in the above abstract. There is first an extensive account of urban and jungle fever in other countries, and of field and experimental work on their mosquitoes and their capacity as vectors of, particularly, jungle yellow fever. This general statement is then considered in terms of conditions and problems in Argentina. On evidence from other territories the following Argentine species, besides *Aëdes aegypti*, are thought to be particularly interesting: *Aëdes scapularis*, *Aëdes leucocelaenus*, *Haemogogus capricorni*, *H. sp. spegazzinii*, *H. uriartei* and genera of sabethines. Each is discussed at some length, with reference to the literature, to provide a fairly comprehensive picture of its habits. Figures are included for differentiating *Anopheles*, *Aëdes* and *Culex* in the different stages. A very detailed list of the known distribution of these species in Argentina concludes the paper.

The paper appears to have a useful purpose in setting down, for Argentine workers, an understanding of jungle yellow fever as it has been elucidated in other South American territories and the lessons to be drawn from this in relation to future studies in Argentina.

D. S. Bertram

RABIES

Ahuja, M. L. **Rabies in India.** *J. Trop. Med. & Hyg.* 1958, Apr., v. 61, No. 4, 95–9.

Today rabies is widely distributed throughout India where, so far as is known, the disease has existed for centuries. The fact that in India more

than 150,000 persons bitten by rabid animals undergo anti-rabies treatment annually serves to indicate the size of the problem. In the transmission of infection the dog plays the leading role, being responsible for some 90% of all bites inflicted, but other animals, particularly the jackal and wolf, constitute important reservoirs of the virus. In man the disease generally manifests itself between 1 and 2 months after the bite, the incubation period varying according to the site of wounding; thus the average incubation period in one series for head, neck and face bites was 34 days, for bites on the upper extremity 46 days, and for bites on the lower extremity 78 days. Incubation periods of less than 15 days and more than 12 months have, however, been observed. Once the disease has developed no therapeutic measure can prevent a fatal issue. In the great majority of persons who have been exposed to infection, however, the disease can, by appropriate prophylactic measures, be prevented from developing. Such measures consist of local treatment of the wound, followed by vaccine or sero-vaccine therapy.

Evaluation of local treatment in experimental rabies—in street virus infections of guineapigs—shows that cauterization of the wound within 4 hours with nitric acid or phenol exerts a very definite protective effect, whereas application of these substances 24 hours after infection is much less effective. The use of tincture of iodine is also of value as a first-aid treatment, but irrigation with 1% soap solution has little or no effect. Moreover no protection is afforded when hyperimmune serum is applied directly on the wound and infiltrated into the site 4 hours after infection, and only slightly better results follow intraperitoneal injection of the serum [see Ahuja and Suri, this *Bulletin*, 1955, v. 52, 151; and 1956, v. 53, 177]. In the author's experience results obtained with serum treatment alone, apart from prolonging the incubation period, are poor as compared with vaccine therapy. The use of potent rabicidal sera in combination with anti-rabies vaccination would, however, appear to be a promising line of treatment and if the results of such combined therapy in experimental rabies are confirmed in field trials in human beings, the best method of prophylaxis would be: cauterization of the wound with nitric acid or phenol, followed within 24 hours of the bite by an inoculation of hyperimmune serum and, 24 hours later, by the first of a series of vaccine injections.

In discussing prophylactic vaccine treatment in general, the author refers in particular to the protective value for human beings of Semple vaccine prepared from 5% sheep brain in 0·05% carbol distilled water (DWV) instead of, as previously, in 0·5% carbol saline (SV). Results at the Central Research Institute, Kasauli, and at its subsidiary centres, showed deaths from hydrophobia per 20,000 persons fully treated to be: 3 in the 5-year period 1951–55, when DWV was used, as compared with 104 and 66, respectively, in the preceding decades 1931–40 and 1941–50, when SV was employed. The antigenicity of vaccine prepared in distilled water seemed, therefore, to be considerably increased. Moreover, the

incidence of neuroparalytic accidents among the 192,705 patients treated with DWV was approximately 1 in 19,000, as compared with 1 in 10,700 among the 267,592 treated with SV between 1941 and 1950. In this connexion, however, it is noteworthy that among 12,974 patients treated during 1954 with DWV prepared at the Pasteur Institute, Coonoor, 3 (1 in 4,325) developed paralytic accidents—an incidence considered by that Institute to be too high to warrant further use of this type of vaccine.

Finally the highly complex problem of rabies control in India is considered. While the difficulties of effective control in so vast a subcontinent with its hundreds of thousands of villages are recognized, much, it is felt, could be accomplished by securing, through energetic publicity campaigns, the active and intelligent co-operation of the inhabitants, by carrying out pariah dog eradication programmes on an intensive scale in each district twice each year, by the mass vaccination of dogs, where practicable, and by introducing rewards for the destruction of jackals. [The discrepancy between the results obtained by the author and those obtained by many other workers, *e.g.*, Perez Gallardo *et al.* (*Bull. World Health Organization*, 1957, v. 17, 963; see also this *Bulletin*, 1958, v. 55, 753), with locally or systemically administered hyperimmune serum may lie in real differences of potencies of the sera employed, despite their apparent similarity in titre.] *G. Stuart*

Porzecanski, B. El control de la rabia en el Uruguay. [**Control of Rabies in Uruguay**] *Bol. Oficina Sanitaria Panamericana.* 1958, Mar., v. 44, No. 3, 199–202, 3 figs.

Uruguay has been free from rabies since 1950, despite the presence of animal rabies on the frontiers of its neighbours, Argentina and Brazil. The author shows how this has been effected and how such control in a small country, favourably situated for the purpose, may be accomplished without a large deployment of staff, mass vaccination of dogs or intensive educational campaigns.

Canine rabies had existed in Uruguay since 1807 at least, when it was introduced by dogs from Europe. Sylvatic rabies has never been a problem, as the country is flat, free of large forests and with few feral animals. Although the haematophagous bat, *Desmodus rotundus*, exists in the north, permanent veterinary control exists there as it is a cattle-raising area; and, in fact, paralytic rabies has not been recorded in cattle nor have infected bats been found.

Population density in Uruguay is 15 per square kilometre; 1 million people (40% of the population) are concentrated in Montevideo and its environs. The capital is also the centre of major concentration of dogs and for long periods was the source of permanent foci of canine rabies, while the rural areas, having only 7 people per square kilometre, experienced only sporadic cases which came from Montevideo in the south or from the Brazilian border in the north.

A map shows that Uruguay possesses effective natural barriers against rabies: the great rivers in the west, the Yaguarón river and the Merín lagoon in the east and in the south the Atlantic seaboard and the river Plate. The most vulnerable areas are clearly the remaining 400-kilometre frontier with Brazil in the north, and, of course, the port of Montevideo itself. Furthermore, the country is divided across the centre into 2 separate and epizootiologically different zones by the Negro river which is broad, has a strong current and possesses no traffic bridges. The southern part includes Montevideo and its environs; in this large southern area, which covers 65% of the country and includes 80% of the population, rabies has been eradicated in the 10 years from 1944 by means of a constant campaign against stray dogs. Although the northern zone is much more vulnerable the population is smaller, more scattered and there are fewer dogs. Few towns have more than 50,000 inhabitants and the process of eradication in the great cattle raising areas has been effected by getting rid of existing foci and vigilant control of the frontier, where the people are well aware of the danger of rabies.

The resources of the permanent control system are therefore concentrated on the areas of major density and transit. In Montevideo and its environs, an average of more than 11,000 dogs are captured annually and some 9,000 are destroyed within 24 hours: the remainder, those reclaimed by their owners, are vaccinated. There are 2 permanent mobile units, manned by 2 *enlazadores*, who lassoo as many as 40 dogs in 2 to 3 hours in a morning. In the smaller towns in the interior, it is sufficient for the mobile unit to visit the area every 3 or 4 months for a week. No mass education is required: schoolchildren are brought up to understand the rabies problem and the people in general are aware of the position, both from existing legislation and from the constant appearance of the mobile units in the streets, so that there has been formed a "collective conscience" regarding the problem and an acceptance of the means to deal with it. *H. J. O'D. Burke-Gaffney*

Kantorovich, R. A. **The Etiology of "Madness" in Polar Animals.** *Acta Virologica.* Prague. 1957, July–Dec., v. 1, Nos. 3/4, 220–28, 3 figs. on pl.

"1. Seventy three strains of virus were isolated from animals suffering from polar madness and from clinically 'healthy' individuals.

"2. These strains were biologically and serologically closely related to rabies virus. Immunization with Fermi vaccine protects animals from infection with lethal doses of polar madness virus.

"3. Acidophil cytoplasmatic inclusions of the Negri body-type are found in nerve cells of the brain of animals in natural and experimental polar madness. The pathomorphology of polar madness shows a number of characteristics that underline the special character of this disease.

"4. The sum of the characteristics of polar madness virus studied makes it possible to distinguish it from the virus of encephalomyelitis of polar foxes and foxes.

"5. The polar madness virus appears to be a variant of the rabies virus and thus a form of natural variability of the latter in natural conditions of the polar region.

"6. Polar foxes, subjected to frequent epizootics of the disease, are one of the reservoirs of the polar madness virus."

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

HIGUCHI, K. & CARLIN, C. E. **Studies on the Nutrition and Physiology of *Pasteurella pestis*. II. A Defined Medium for the Growth of *Pasteurella pestis*.** *J. Bacteriology.* 1958, Apr., v. 75, No. 4, 409–13, 1 fig. [12 refs.]

Studies on the growth of *P. pestis* in chemically defined media have shown that at 27°C. the minimal growth requirements are satisfied by media containing relatively few amino-acids and no added accessory growth factors [this *Bulletin*, 1952, v. 49, 509, 1113]. The present report deals with the development of a chemically defined synthetic medium which is capable of supporting growth of a number of strains of *P. pestis* to yield viable cell populations in the range of 40 to 60 billion cells per ml. Though a number of strains were employed the development of the medium was based chiefly on results obtained with an avirulent strain.

A synthetic medium was developed for growth at 27°C. containing 10 amino-acids, D-xylose and a combination of 7 organic and inorganic salts.

The nutritional requirements of *P. pestis* are more exacting at 37°C. than at temperatures below 30°C. A modification of the standard medium for use at 27°C. was developed but yields in this medium at 37°C. were considerably lower than the yields obtained in the standard medium at 27°C., being in the range of 10 to 30 billion organisms per ml.

The original should be consulted for details of the media.

[For Part I of this series, see this *Bulletin*, 1957, v. 54, 952.]

P. A. Clearkin

Hartwell, W. V., Quan, S. F., Scott, K. G. & Kartman, L. **Observations on Flea Transfer between Hosts; a Mechanism in the Spread of Bubonic Plague.** *Science.* 1958, Apr. 11, v. 127, 814.

Actual transfer of fleas (*Malaraeus telchinum*) from Californian voles (*Microtus californicus*) to domestic rats (*Rattus norvegicus*) is demonstrated in experiments simulating field conditions. The fleas were tagged with cerium, ^{144}Ce [this *Bulletin*, 1957, v. 54, 759], released in the experimental areas or on the hosts, and later recognized by suitable monitor instruments in the nests of the *Rattus* (but not *Microtus*), on captured *Rattus* and *Microtus* or as traces in the faeces of *Microtus* due to their being eaten by the voles.

Of 60 fleas released altogether, 81·6% (49) were accounted for in 56 days, most of them as late as the last week of this period. Initial counts of (6·2 to 8·5) × 10^2 counts per flea per minute had declined in 56 days to (3·6 to 5·1) × 10^2 counts.

Further work continues but these results offer direct proof of the transfer of individual flea specimens readily from a field vole to a house-frequenting rat, confirming a mechanism widely accepted on indirect evidence to be important in human plague epidemiology [*ibid.*, 1958, v. 55, 36]. *D. S. Bertram*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Valentinčič, M. & Kozak, M. Dosedanja spoznanja o prekuženosti prebivalcev Slovenije z dizenterijsko amebo. [**The Present Knowledge of Infestation of the Population in Slovenia with** *Entamoeba histolytica*] *Zdravstveni Vestnik.* Ljubljana. 1957, v. 26, No. 11. 453–6.

In stool examinations carried out on 1,467 persons, mainly children attending schools and other institutions in Slovenia, *Entamoeba histolytica* was found in 247 (16·83%), *E. coli* in 536 (36·45%), *Endolimax nana* in 619 (42·10%), *Iodamoeba bütschlii* in 388 (26·40%), *Trichomonas intestinalis* in 68 (4·65%), *Tricercomonas hominis* in 67 (4·58%), *Giardia intestinalis* in 159 (10·82%) and *Chilomastix mesnili* in 22 (1·50%) instances. *D. J. Bauer*

Benham, R. S. & Havens, Isabelle. **Some Cultural Properties of *Endamoeba histolytica*.** *J. Infect. Dis.* 1958, Mar.–Apr., v. 102, No. 2, 121–42, 16 figs. [34 refs.]

The literature on the culture of *Entamoeba histolytica* is briefly reviewed. The initial success of Boeck and Drbohlav [this *Bulletin*, 1925, v. 22, 727] was obtained with diphasic medium in association with a mixed bacterial flora. Subsequently, success was attained by others with a single bacterial associate or for a limited period in the absence of bacteria. Phillips, with Rees [*ibid.*, 1950, v. 47, 624, 741] finally substituted *Trypanosoma cruzi* for the bacteria.

The present experiments were carried out to find if culture of *E. histolytica* was possible in the absence of other living organisms, and possible also in continuous culture and to assess the value of the methods for the preparation of antigenic material.

A number of strains of *E. histolytica* accompanied by an unknown flora, by a single bacterium or by *T. cruzi*, were used. All the methods are described in detail. Since the presence of starch along with amoebae sometimes caused the death of rabbits on inoculation with culture material as the result of embolus formation, new sources of starch of very fine grain were sought. The seeds of a number of plants proved suitable. Replacement of starch grains by the soluble form or by proteins of high molecular weight did not give such good growth of amoebae. Elaborate tests were carried out to determine the fragility of *E. histolytica* in regard to salt concentration, and comparison was made with that of human red cells. Ionic concentration appeared not to be of importance as a cause of lysis of amoebae in culture. Strains of amoebae could be grown with selected bacteria by freeing cysts of accompanying bacteria by chemical means. Cysts also appeared to be resistant to freezing for short periods. Growth curves were constructed for a number of different strains of the organism after fixation in formalin. Growth curves were also made of slide cultures by direct microscopic examination. By plotting growth curves of amoebae in different media it appeared that in some a phase of negative acceleration occurred, before the phase of positive acceleration. During the latter phase the time required for doubling the number of amoebae ranged from 1·25 to 4 hours. It was shown in these cultures studied over a period of 120 hours that the type of medium used was an important factor. Finally autolysis proceeds faster than multiplication. A small inoculum of well-washed amoebae is recommended for starting the cultures. For continuous culture of amoebae two types of apparatus, clearly figured and described in great detail, were designed. Tests were first made of growing *T. cruzi* under the same conditions. The dynamics of continuous culture of the amoebae and trypanosomes is discussed. A further apparatus is described in which the two arms of a U-tube, separated by a sintered glass disk, contained amoebae free from bacteria on one side and *T. cruzi* or its products of disintegration on the other.

After washing amoebae in culture and freeing them as much as possible from extraneous material, their nitrogen content was estimated and according to the authors should be of value in studying the quantitative aspects of immunology.

In continuous cultures amoebae remained alive for many months and about 150,000 amoebae with 10^7 *T. cruzi* were present per ml. of fluid. The apparatus used lent itself to the testing of new types of media under varying conditions and contamination by other organisms was easily eliminated. Pure cultures of *E. histolytica* appear to have been obtained by using the sintered disk mentioned above. Growth, however, was poor under these circumstances and did not generally extend over more than 2 or 3 generations. Sterile filtrates of the frozen and thawed broth phase of *T. cruzi*, mixed with reduced thioglycollate, supported amoebic growth during as many as 10 subcultures but the yield was never large. In spite of the disadvantage of starch grains as a cause of emboli on infecting rabbits with sediments containing amoebae, the value of these grains in the discontinuous cultures of *E. histolytica* was established. The occurrence of nitrogenous material with starch grains is regarded as a possible source of nutrient for amoebae. Too much starch was, however, found to interfere with the production of amoebic antigen. The many desirable and necessary qualities of an organism used in culture with *E. histolytica* are apparently possessed by *T. cruzi*.

[This detailed and interesting paper should be read by those working in this field.] *J. D. Fulton*

Gillot, F. & Raoux, J. P. Note thérapeutique: le traitement de l'amibiase intestinale chez l'enfant. [**Treatment of Intestinal Amoebiasis in Children**] *Algérie Méd.* 1957, July, v. 61, No. 7, 789–99. [18 refs.]

This is a recapitulation of French opinion on the treatment of amoebiasis, but it contributes nothing original on the subject.

A. R. D. Adams

Diamant, E. J. **Carbohydrate Metabolism in Emetine-Poisoned Rats.** *J. Pharmacol. & Exper. Therap.* 1958, Apr., v. 122, No. 4, 465–73, 1 fig. [35 refs.]

"Prolonged treatment of young growing rats with small daily doses of emetine leads to a significant reduction in food intake resulting in a diminished growth.

"The livers of both fed and fasted emetine-treated rats contain less glycogen than those of pair-fed controls. *In vitro* glycogen synthesis from glucose is markedly depressed in liver slices from fasted, emetine-treated animals and completely inhibited when pyruvate is used as

substrate. Gluconeogenesis in the presence of pyruvate is likewise lowered after such treatment.

"There is a significant decrease in the phosphorylase and aldolase activities in homogenates prepared from livers of emetine-treated rats.

"The implication of these findings for the toxicity of emetine is discussed."

[See this *Bulletin*, 1949, v. 46, 1035.]

Ruiloba, J. & Peña, J. C. Amibiasis intestinal. Evaluación de los tratamientos seguidos en el Hospital de Enfermedades de la Nutrición. [**Evaluation of Forms of Treatment of Intestinal Amoebiasis carried out in the Hospital for Nutritional Diseases, Mexico**] *Rev. Invest. Clin.* 1957, Oct.–Dec., v. 9, No. 4, 529–35, 1 graph. English summary.

Different surveys of the population have shown that intestinal amoebiasis has an incidence of 6% to 85% in Mexico. Between October 1946 and January 1952, of 13,000 patients attending the authors' hospital, the incidence was 30·7%.

They use for routine treatment oxyquinolines and arsenicals and they report on the treatment with the doses "considered usual" of 1,489 patients with one or the other or both. The patients had subacute or chronic amoebiasis and the criterion of cure was disappearance of *E. histolytica* cysts from the stools during a 6-month period of follow-up. Cure was achieved in 67% of 277 patients treated with oxyquinolines, 82% of 790 treated with arsenicals and 78% of 422 treated with both drugs (simultaneously or alternately).

In patients with acute amoebic dysentery rectosigmoidoscopy was carried out before and 3 months after treatment. The exudate was examined for trophozoites and the faeces were also examined, by Faust's method. Cicatrization of the ulcers and disappearance of the trophozoites, without relapse, were taken as the criterion of cure. Cure was achieved in 12 of 13 such patients treated with Aldarsone [Phenarsone], and in all of 8 treated with fumagillin. The following results were also obtained:

	Cases	*Cured*
chlortetracycline	3	2
oxytetracycline	5	0
erythromycin	5	4
tetracycline with nystatin ...	7	6

Similar results were obtained with 63 patients in the subacute and chronic stages examined by rectosigmoidoscopy, but the parasitological follow-up has still to be completed.

The apparently incongruous results with arsenicals in combination with

oxyquinolines are attributed by the authors to the fact that this combination was used in cases which had failed to respond to either drug separately and were therefore presumably more resistant. The authors still believe that the combination is superior to either type of drug given separately.

The authors found Faust's flotation method the most satisfactory for the examination of stools. Maximum efficiency was achieved when at least 6 specimens were examined. *H. J. O'D. Burke-Gaffney*

DE CARNERI, I. **The "*in vitro*" Sensitivity of Four Strains of *Entamoeba histolytica* after Various Periods of Incubation.** Reprinted from *Arch. Internat. Pharmacodyn. et Thérap.* 1958, Jan. 1, v. 113, Nos. 3/4, 273–89. [41 refs.]

The author briefly reviews the *in vitro* methods of testing amoebicidal action and indicates their failings as judged by the variable results recorded from different laboratories. The methods used do not as a rule pay any attention to the speed of action of a drug. In the present experiments he has used 4 strains of *E. histolytica* from widely different geographical sources, accompanied by a mixed bacterial flora. The substances tested were Yatren, carbarsone, chloroquine, pyrimethamine, dihydrostreptomycin, penicillin, bacitracin, erythromycin, aureomycin, oxytetracycline, tetracycline, D and L-threochloramphenicol, trichomycin, emetine and fumagillin. The effect of drugs was determined by microscopic examination of cultures at periods ranging from 15 minutes to 72 hours.

The results obtained were compared with those obtained by standard methods after 48 hours' incubation. A difference in the sensitivity of the different strains of *E. histolytica* was noted. The time factor in antiamoebic action was found to be of importance.

The author concluded that the use of a biphasic medium was undesirable in these tests. In monophasic medium some antibiotics active against bacteria were without effect on amoebae if a vigorous bacterial flora was present. The two optical isomers of chloramphenicol appeared to exert equal direct amoebicidal activity. Some amoebicides act rapidly, others only slowly, and examples are quoted. *J. D. Fulton*

DA SILVA, L. S. **A Study of Amoebicidal Action of Certain Drugs and Antibiotics.** *Proc. Alumni Ass. Malaya.* 1958, Mar., v. 11, No. 1, 11–16, 7 figs.

This article forms part of a thesis for the MD degree in the University of Malaya. The author used a diphasic medium, with all its concomitant disadvantages, in the estimation of amoebicidal potency. Tables are given showing the activity of emetine, oxytetracycline and chloroquine *in*

vitro. Under the author's conditions, comparison with results obtained elsewhere would not be possible and no observations are made on the substances under test for antibacterial activity. In his experiments with bile in which disintegration of amoebic trophozoites was caused and also damage to cysts, no indication of *p*H conditions or tonicity of medium are given. Bile salts, but not bilirubin, were also very active in causing disintegration. The use of bile salts in treatment of amoebiasis, by mouth in capsules, by colonic lavage or enemata or by direct instillation into liver abscesses is suggested. Results are given in tabular form of the combined action of emetine and chloroquine with bile salts on *E. histolytica in vitro*; and a synergic action between them is claimed. For enemata and treatment of skin infection a 3 to 5% solution of desoxycholate is suggested and 0·2 to 2% for instillation into liver abscesses.

[Since infective material would be expected to be in contact with bile and bile salt in its passage through the small intestine, the value of these substances as amoebicides does not appear to have been proven.]

J. D. Fulton

Lamy, L. & Molinari, V. Étude expérimentale de l'activité de substances antibiotiques sur *Entamoeba histolytica* en culture dans ses rapports avec la flore bactérienne associée. [**Experimental Study of the Activity of Antibiotic Substances on Cultures of *Entamoeba histolytica* and its Relationships to the Associated Bacterial Flora**] *Ann. Inst. Pasteur*. 1958, May, v. 94, No. 5, 655–9. [12 refs.]

The authors have tried to interpret the results obtained with amoebicides on *E. histolytica* in relation to the nature of the accompanying bacterial flora. They have used some 20 antibiotics including penicillin, fumagillin and others equally well known in their experimental study of the mode of action of these substances.

They recall that an amoebic culture contains, besides *E. histolytica*, a complex bacterial flora generally of unknown nature. The addition of antibiotics tends to upset the prevailing equilibrium either in favour of the amoebae or against them. By the use of 6 strains of *E. histolytica* and 12 classical antibiotics the nature of the response to the 72 varying sets of conditions was first studied. As a result 2 strains were chosen, one Lx whose bacterial flora was very sensitive to chloramphenicol, and another, Br, whose flora was insensitive to this drug. Doses of antibiotic were used with the strains, so that in culture Lx lack of bacterial multiplication was followed by death of the amoebae, but in Br similarly treated neither bacteria nor amoebae were affected. When the resistant bacterial flora was transferred to the sensitive culture and treatment with chloramphenicol was given as before, the amoebae of culture Lx survived. Components of the Lx flora resistant to chloramphenicol having been isolated by exposure to increasing doses of the drug, the culture on treatment with high doses of the antibiotic now allowed amoebic growth.

The authors therefore concluded, in view of the apparently contradictory results obtained with one antibiotic, that the activity of antibiotics in general against amoebic cultures depends on the bacterial flora present, or equally that the action on amoebae in this case was indirect. They recommend that before conclusions are drawn about the action of drugs in these circumstances, the effect on the accompanying bacterial flora should first be determined and concomitantly the effect of the drug on amoebae in presence of a resistant flora should be studied. When sterilization of culture medium is brought about no bacteria are available for phagocytosis and metabolic products for conditioning the medium to render it suitable for amoebae are absent. *J. D. Fulton*

DE CARNERI, I. Spezifität und Geschwindigkeit der Wirkung zweier verschiedener Reihen von Dichloracetamid-Derivaten auf 3 *Entamoeba*-Arten. [**Specificity and Speed of Action of Two Series of Dichloracetamide Derivatives on 3 Types of Amoebae**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1958, v. 9, No. 1, 32–42. [20 refs.]

In an earlier report [this *Bulletin*, 1957, v. 54, 1016] the author has shown that the anti-amoebic action of chloramphenicol is not associated with the steric configuration of the molecule and that the dichloracetamide grouping is essential for activity. Two series of dichloracetamide derivatives have now been studied, one series being derivatives of propiophenone or acrylophenone, the other series contained a diphenylether group. The exact chemical constitution of these compounds is given. Their toxicity, with the exception of the acrylophenone, was relatively low. In the tests 3 strains of *E. histolytica*, 1 of *E. invadens* and 1 of *E. moshkovskii* were used. They were grown in large flasks containing Pavlova medium with the addition of 5% horse serum and rice starch, *E. histolytica* at 37° and the two other species at 26°C. A mixed bacterial flora was present. The drugs, being somewhat insoluble, were first dissolved in ethyl alcohol plus Tween 80, and were then added to the culture medium to give suspensions which were then serially diluted as required. Controls in absence of drug were also prepared. A standard suspension of the amoebae grown in bulk, about 150,000 trophozoites in each case, was added to pairs of tubes containing the same drug concentration. During the test *E. invadens* was kept at 26°C. and the two other species at 37°C. Subcultures were made in an attempt to make sure of the death of all amoebae but were never successful.

The first series had a broad anti-bacterial spectrum and were active against certain other parasites such as trichomonads and helminths. They showed greater activity against *E. histolytica* than against the two other amoebic species, and their action was rapid. The activity of the second series was shown against amoebae only. They do not act rapidly and only *E. histolytica* was affected. The author points out that the

first group resemble chlortetracycline and trichomycin in activity and the second group by their slower action are more like emetine and fumagillin.

J. D. Fulton

NETIK, J., LARIVIÈRE, M. & QUENUM, G. Un cas de dysenterie balantidienne mortelle. [**A Fatal Case of Balantidial Dysentery**] *Bull. Méd. de l'A.O.F.* Dakar. 1958, Jan.–Mar., v. 3, No. 1, 136–40, 3 figs.

6 days after her delivery an African woman in Senegal developed signs of nephrosis and died of intestinal haemorrhage in a month. Autopsy showed the presence of numerous ulcers 2–3 cm. long in the large intestine, especially at the level of the caecum and ascending colon. At first tuberculosis was suspected, but histological sections revealed the presence of many protozoa resembling *Balantidium coli*. These are described and illustrated. They measured 18 to 27 μ and were rather smaller than the balantidia of pigs. The patient was a Moslem who had had no contact with pigs, but examination of the intestinal contents of 27 rats in a neighbouring village revealed 2 which showed the presence of parasites similar to those found in the patient.

The authors note the similarities of the findings, in general, with those recently described by BROWNE in a child in the Belgian Congo [this *Bulletin*, 1958, v. 55, 163]. In the present authors' case, the aetiology is, however, uncertain. They are unaware of any similar record in Senegal.

H. J. O'D. Burke-Gaffney

RELAPSING FEVER AND OTHER SPIROCHAETOSES

WALTON, G. A. **Studies on *Ornithodorus moubata* Murray (Argasidae) in East Africa. Part II. Experimental and Microclimatic Evidence of Biological Variation.** *East African Med. J.* 1958, Mar., v. 35, No. 3, 107–36, 4 figs. [18 refs.]

This is the third major paper reporting the findings and conclusions of the author from his field and laboratory work since 1948 on the biology of *Ornithodorus moubata* in East Africa. There is a good deal of overlap in the subject matter of the three papers. The present paper includes changes in the designation of the biological variants of the tick. The two earlier papers [see this *Bulletin*, 1958, v. 55, 510 and 895] specify the variants as the "man-eating" form, "chicken-eating" form, "wart-hog" form and, in the latter paper only, a fourth—the "mixed-feeding" form. These are now designated, pending further studies particularly of possible morphological differences, respectively, Form A, Form B, Form

C and Form D. Hybridization with substantial fertility is proved in the laboratory, but is not thought to be usual in nature. What may prove a fifth form has recently been obtained from South Africa.

This paper includes a long summary which, in effect, summarizes Part 1 of this series of papers [*ibid.*, 1958, v. 55, 895] and much of the original statement of the thesis [*ibid.*, 1958, v. 55, 510] besides what is particularly elaborated in this paper itself.

Abbreviated definitions of the biological variants of *O. moubata* are as follows:

Form A ("*man-feeding*" *form*)

In African huts at high altitudes with cool, wet climates; markedly anthropophilic; lays many eggs; negatively phototropic, and comparatively easily, for this kind of tick, starved (within 2 years after 1 blood meal). Although only 1% are infected with *Spirochaeta duttoni*, its choice of human host makes it an efficient vector. It cannot persist in areas where bed-frames are used. Duration of feeding on host is about half-an-hour, with coxal fluid secreted early and until detachment; shape when gorged [this is illustrated] oblong-ovate; usually 4 nymphal stages precede females or males. Distribution: *Kenya* (above 4,000 ft.)—Jombeni Mountains, Nyeri District Kikuyu Reserve, Teita Hills; *Tanganyika*: Usambara Mountains, Ukerewe Island (wet region), Ngara and Bukoba Districts at Lake Victoria. Expected distribution: Belgian Congo, Nyasaland, Mozambique highlands.

Form B ("*chicken-feeding*" *form*)

In African huts in hot, or warm, moist areas; almost exclusively feeds on domestic fowl, which support very heavy infestations of huts; lays fewer eggs, more negatively phototropic than Form A; resistance to starvation rather better (2½ to 3 years approximately). Owing to preference for fowl blood, the 1% infection rate for *S. duttoni* is not associated with high incidence of human disease. Although actual feeding takes place in half-an-hour, attachment persists for an hour or more; coxal fluid is secreted for much of the time, wetting the tick's whole body by creep. Fed shape is flatter at front than behind. Numbers of nymphal stages are similar to Form A. Distribution: *Kenya*: Digo District (pure) and Embu District (small numbers); *Tanganyika*: Usambara Mountains, drier areas Ukerewe District, damp areas Sukumaland, Singida (plentiful). Ngara and Bukoba Districts (small numbers).

Form C ("*warthog*" *form*)

Far from human habitations, in burrows and lairs of, usually, porcupine and warthog, and in hollow baobab trees; lays intermediate numbers of eggs compared to Form A and B. A very active tick, positively phototropic to sunlight (when hungry); very resistant to starvation (nearly 60%

still alive 4 years after a single meal). Although infected readily with *S. duttoni* if fed on infected baby mice, it is not considered a source of infection to man since infection was not demostrated in field material of those ticks or, naturally or experimentally, in numerous warthogs, or one porcupine [*ibid.*, 1951, v. 48, 42; 1955, v. 52, (271); 1956, v. 53, 1961]. Feeding on the host lasts under half-an-hour; coxal fluid excreted for nearly half this time. The fed shape is semi-spherical; reluctant to feed on rabbit. The majority of females and males are preceded by five nymphal stages. Distribution: From the southern Sudan into northern Uganda and southwards in eastern Belgian Congo and central Kenya, through Tanganyika to the Rhodesias and northern Transvaal.

Form D ("mixed-feeding" form).

This form, from African huts, has not been studied so long as the others. It occurs in African huts in hot, arid conditions with uncertain rainfall, feeding—it appears—with equal facility on man and domestic fowl. It resembles Form A in its fed shape ("the recognition feeding test"); nymphal stages as in Form A and B. The second last nymphal skin is "tougher" than in other forms. It appears to be a form which becomes increasingly abundant in huts with increasing dryness, even although fowls may be few. It is probably the form abundantly found in hot, dry, central Tanganyika. Epidemiologically not very significant. It has potentialities for spreading elsewhere including lower, drier, tick-free parts of Kenya.

A fifth form:

From huts at Groot Marico Transvaal, and to be dealt with in a later publication.

[Tremendous work and effort lies behind such prolonged studies with these slow-growing ticks.

The paper should be consulted in the original for its detail on relative humidity and temperature values of tick micro-environments, *O. moubata* in animal burrows, soil factors and man's sleeping habits (which are restrictions to tick infestation), tests for female productivity, longevity, cross-breeding of the forms and the "recognition feeding test" (illustrated). It is perhaps, as the author comments, less committal to the whole problem of the discreteness of the forms that the designation of "man-eating" form, etc., is herein altered to Form A, etc. It is worth bearing in mind that the author's assignation of the ticks (p. 130) to Groups I, II and III classifies the several forms in terms mainly of the shape they adopt in gorging. In this, Form C falls into Group I, Form B characterizes, in this respect, Group II, and Form A and Form D, engorging with similar manifestations of shape, etc., are together in Group III. Inversion of these serial numbers to conform with the main alphabetical order would have been helpful to the reader. The text, already requiring (and deserving) careful study, is made, it also seems to

the abstracter, unnecessarily difficult when (pp. 120–121) certain of the pure strains used for longevity and productivity are tabulated as Group 1 (Form A), Group 2 (Form B) and Groups 3 and 4 (Form C from Kenya and Tanganyika, respectively). Groups I to III are acceptable and legitimate; but Groups 1 to 4, which are merely a textual arrangement relevant only to the convenience of the 2 pages in question, might have been less emphasized. It is perhaps useful to draw attention to this artificial specification in an elaborate analysis of a difficult problem involving already in its presentation 3 interim nomenclatures for biological groupings of, so far, morphologically indistinguishable ticks. Some inconsistencies in the references were noted. The author is to be commended for the stimulus of much that is new fact and new thought to the simple classical concept of the association of man, relapsing fever spirochaete and *O. moubata* in East Africa. If morphological differentiation of the forms proves in the end less practicable than may be desirable, this need not invalidate the substance of the present findings, nor would it be new as a troublesome but inescapable reality in medical entomology.] *D. S. Bertram*

YAWS AND OTHER TREPONEMATOSES

Motta de Aquino, U. **Yaws in Brazil.** *Bull. World Health Organization.* Geneva. 1958, v. 18, No. 3, 461–3.

Yaws is found in the northern, north-eastern, eastern and mid-western regions of Brazil, endemic zones being characterized by a hot, rainy climate. In some places its distribution overlaps that of pinta. Migratory movements of the population tend to spread yaws and other endemic diseases, and create difficulties in the organization of preventive campaigns. A mobile field unit organized by the author, using jeep and mule transport, proved to have speed and ability to penetrate foci difficult of access, two qualities essential for success. Treatment was by a single injection of benzathine penicillin G. A system of health control of migrating populations is urgently needed. Mobile field units would appear to provide the answer.

Other common endemic diseases in these regions are leprosy, filariasis, trachoma, blastomycosis, leishmaniasis, tropical ulcers, scabies, pyodermatitis, schistosomiasis, amoebiasis, hookworm and other intestinal helminthiases, and gonorrhoea.

[See also this *Bulletin*, 1953, v. 50, 775.] *B. B. Waddy*

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Tarabini C., G. Consideraciones del origen de la disproteinemia hanseniana y sus efectos. [**Consideration of the Origin of Dysproteinaemia in Leprosy and its Effects**] *Rev. "Fontilles"*. Valencia. 1957, July–Dec., v. 4, No. 4, 227–34. [13 refs.] English summary. Colesterina y lipoproteínas séricas en la enfermedad de Hansen. [**Cholesterin and Lipoproteins in the Sera of Leprosy Patients**] *Ibid.*, 235–45. [12 refs.] English summary. Glicoproteínas séricas en la enfermedad de Hansen. [**Glycoproteins in Sera of Leprosy**] *Ibid.*, 247–54. [10 refs.] English summary. Acerca de las uroproteínas en la nefrosis hanseniana. [**Uroproteins in Leprous Nephrosis**] *Ibid.*, 255–69. [20 refs.] English summary.

Examination of the blood serum of 100 lepromatous patients showed hyperproteinaemia in the larger proportion, and hypoproteinaemia only in those with nephritis or repeated reactions. Serum albumin was diminished and globulin, especially gamma globulin, was considerably increased. The most serious damage caused by this disproportion of proteins was visceral amyloidosis. In the author's opinion the serious symptoms of leprosy are caused by 3 factors: the granuloma of the disease, the changes in the blood serum and the deposit of paraproteins (especially amyloid substance) in the viscera.

The sera of 52 lepromatous patients were examined to determine the proportion of cholesterin and the relative amounts of alpha and beta lipoprotein. These were fairly normal in patients whose general condition was good. In those with reaction or hepatic lesions cholesterin and alpha lipoprotein were reduced. Those with renal disease and those with liver and renal conditions combined showed increased cholesterin and the proportion of alpha lipoprotein was very much diminished. Patients treated with corticotrophin, cortisone or prednisone showed decreased cholesterin and increased proportion of alpha lipoprotein. Electrophoresis was used with paper stained with Sudan black B for the lipoproteins, and Sol's method for cholesterin.

In lepromatous leprosy a study of sera from 36 patients showed a decrease of glycoalbumin in relation to glycoglobulin, and an increase of alpha 2, beta and gamma glycoglobulins, both of these in proportion to the frequency of lepra reactions, and hepatic and renal conditions.

The urine from 39 leprosy patients with proteinuria was examined by the electrophoretic method. In proportion to the gravity of the case the relative amount of gamma globulin was increased.

The author believes that renal disease in leprosy is largely the result of amyloid disease of the kidneys, the glomeruli being chiefly affected.

Ernest Muir

Kooij, R. & Gerritsen, T. **On the Nature of the Mitsuda and the Kveim Reaction.** *Dermatologica.* 1958, Jan., v. 116, No. 1, 1–27, 6 figs. [61 refs.]

The authors first describe the history of the lepromin reaction, its failure in the diagnosis of leprosy, but its usefulness in classification and prognosis. They then compare the Mitsuda and Kveim reactions. The Kveim antigen is prepared from sarcoid tissue, preferably from enlarged lymph glands infiltrated with the granulation tissue of the disease. It is prepared by a method similar to that of Mitsuda-Hayashi-Wade and injected intradermally in a like manner. Danbolt (*Dermato-Venereologica*, Stockholm, 1941, v. 31, 184) reported that out of 46 patients with sarcoidosis 41 showed a positive Kveim reaction, while among 76 without sarcoidosis only 5 were positive. Various workers have shown that similar, though weaker, results can be obtained in sarcoidosis by injecting intradermally heat-sterilized spleen and gland emulsions and suspensions of other particulate substances. Differing results have been obtained by investigators, but the authors consider that these were probably due to varying standards of positivity, as it is possible to find a sarcoid reaction at the site of inoculation by histological examination even when no outward nodule appears.

The present investigation was undertaken to find out whether the bacilli alone were responsible for the reaction in the Mitsuda test. It was found that preparations from normal skin and liver gave positive "lepromin" reactions in tuberculoid cases and negative in lepromatous. "This brought us to the hypothesis that the presence of particles and the size of them might be of importance and that in the Mitsuda reaction we are dealing with a kind of foreign body reaction or isomorphic phenomenon."

It was found that by using the Dharmendra method of preparing antigen reactions were similar with normal liver to those with lepromatous skin and liver, but weaker. Corresponding results were obtained when the Wade method of preparing antigen was followed. The conclusion is reached that the Mitsuda and Kveim reactions are of a similar nature. The authors consider that in reading these reactions a quantitative criterion is necessary. [This paper is of considerable interest and value and may be helpful in solving the enigma of resistance in leprosy.]

Ernest Muir

Rossetti, C., Doglioni, L., Guillén, J. & Tarabini C., G. El test de Nelson-Mayer en la enfermedad de Hansen. [**The Nelson-Mayer Test in Leprosy**] *Rev. "Fontilles".* Valencia. 1957, July–Dec., v. 4, No. 4, 213–26. [38 refs.] English summary.

The authors first, by quoting various published works, emphasize the discrepancies in the numbers of false positives in sera of leprous patients

when various classical complement-deviation and flocculation tests are used. They confirm previous opinion that the treponema immobilization test (TPI) eliminates false positives. In Table I they give the findings of 57 out of 300 patients at the Fontilles Leprosarium. In these 57 patients the TPI test was negative; and the results for each patient with complement-deviation tests in which 4 different antigens were used, and with 4 different flocculation tests, are given. The greatest number of false positives (45) was with the Kahn test.

The authors next discuss the possible reasons for false positives in leprosy. Serum protein study, by means of the paper electrophoresis method, does not point to disproportions of blood proteins as the cause; this, however, may be a predisposing though not a determining factor. The false positives persist even when bacteriological findings have become negative, although it is generally acknowledged that the lepromatous type with its many bacilli shows by far the largest proportion of false positives.

Ernest Muir

Frugoni, C. Contributo alla conoscenza delle manifestazioni otorinolaringologiche nel morbo di Hansen. Studio clinica-statistico su 57 lebbrosi Yemeniti. [**Otorhinolaryngological Manifestations in Leprosy. Clinico-Statistical Study of 57 Cases in the Yemen**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, Jan., v. 39, No. 1, 3–40, 14 figs. [12 refs.] English summary (6 lines).

After a general description of leprosy and a statement that the Yemen is one of the oldest foci in the Middle East, details are given from the point of view of the otorhinolaryngological specialist of 57 cases seen in a number of cities and towns in the country. A point of interest in mass psychology is that in the Yemen the severe mutilations so often found do not give rise to the horror with which they are so often regarded elsewhere—even in neighbouring countries.

Of the 57 patients the nose was affected in no less than 50. One of the earliest manifestations was a muco-purulent rhinitis which always contained numerous leprosy bacilli, but a very early organic lesion also was found in the Valsalva area as a plaque-like greyish infiltrated area often surrounded by a corona of dilated vessels. In many of the patients the cause of death was ingestion pneumonia due to pharyngolaryngeal anaesthesia following lepromatous infiltration. Only 2 cases affecting the ear are mentioned. Here there was a purulent otitis positive for *Myco. leprae*.

For treatment isoniazid is being tried as well as the sulphones, apparently with some success though no figures are given.

W. K. Dunscombe

Touzin, R. & Bocat, R. Contribution à la chimiothérapie-retard de la lèpre par l'Hyrgathione. [**Contribution to the Slow-Absorption Method of Chemotherapy in Leprosy by Hyrgathione**] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 23–31, 4 figs.

Hyrgathione is a 25% suspension of DDS in the ethyl esters of chaulmoogra oil with guiacol and monostearate of aluminium. This suspension was used so that, by slow absorption from the tissues, injections might be spaced out over a period during which the titre of DDS in the blood would not fall below 1 mgm. per litre. Trials showed that it was possible to maintain this titre for a month by injecting 8 cc. of the suspension containing 2 gm. of Hyrgathione. To prevent the titre from gradually rising too high after a series of monthly injections it may be necessary to have occasional suspensions of treatment. *Ernest Muir*

Laviron, P., Beytout, D., Rist, N., Grumbach, Françoise, Libermann, D. & Cottet, J. Essai de traitement de la lèpre par le thioamide de l'acide isonicotinique (3,264 TH). [**Experimental Treatment of Leprosy with Thioamide of Isonicotinic Acid**] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 60–66, 4 figs. on 2 pls. [10 refs.]

The thioamide of isonicotinic acid (TI or 3·264 TH) was tested for its therapeutic effect in 4 cases of lepromatous and 6 cases of tuberculoid leprosy. The patients were previously untreated. At the time of reporting, treatment had lasted 6 months. The original dosage was 2 gm. daily, reduced later to 1·5 or 1 gm. according to the nature of the case. The 4 lepromatous patients showed clinical improvement and the Middlebrook-Dubos test showed lowering of the conditioned agglutination rate. Within the period of the trial there was no change in the number or morphology of the bacilli. In 2 cases there was lepra reaction which necessitated suspension of treatment for a month. In 1 patient there had been lepra reaction of a severe nature which had lasted for several months and had failed to yield to antimony or cortisone; it yielded to TI however within 8 days.

Of the 6 tuberculoid patients 5 made rapid improvement in a phenomenal manner such as the authors had never seen before with any other form of treatment; some patches disappeared and the rest retained only slight discoloration or scar appearance. The sixth patient showed an exacerbation followed by rapid recession.

The treatment showed no signs of producing anaemia, but there was diarrhoea occasionally which was difficult to connect with the treatment. During the first 3 months there was loss of weight of 4 to 14 kgm. in 5 patients, which was arrested, however, when the dosage was halved. There was cheilitis of the lower lip in 3 patients, but this yielded to treatment with vitamin PP. In 1 patient there was loss of the sense of taste,

but this returned on lowering the dose of TI. For all these reasons it was decided to lower the standard dose to 1 gm. per day.

It is observed that the thioamides of isonicotinic acid form a link between the thiosemicarbazones and the disubstituted thioureas, both of which have proved effective in the treatment of leprosy; it is therefore not surprising if the first-named should give particularly good results.

Ernest Muir

DE LAS AGUAS, J. T. La prednisona en las fases agudas de la lepra. [**Prednisone in the Acute Phases of Leprosy**] *Rev. "Fontilles"*. Valencia. 1957, July–Dec., v. 4, No. 4, 203–212, 8 charts. English summary (7 lines).

The author first discusses the causes of lepra reaction in relation to the syndrome of adaptation of Selye. He believes that lepra reaction acts as "stress" on the constitution of the leprous patient, giving a general syndrome of adaptation with a first phase of alarm and discharge of corticotrophin, which sets free the reserves of hormones in the suprarenal. In a second phase the adrenal secretion liberated overcomes the reaction. In a third phase the adrenal cortical reserves become used up and the patient then reaches a condition of continuous reaction. Cortisone and corticotrophin have the power to correct, heal and suppress all the disorders connected with the general syndrome of adaptation, but excessive dosage or want of proper control may produce grave phenomena and even fatal complications.

The author then recounts his experience with prednisone, which among other advantages is 3 to 5 times as powerful as cortisone, can be used in many conditions where cortisone is contraindicated, does not require the same strict regulation of diet, is safer and less toxic. The preparation used was Dacortin Merck, made up in 5 mgm. tablets. Of these 3 to 4 were given for 2 days, 2 or 1½ for 2 days, 1 or ½ for 3 days, and then 1 once a week.

11 patients were treated, 8 of them with general lepra reaction, 2 with joint and bone reaction and 1 with severe inflammation of testis and epididymis. In all these patients, detailed descriptions of whom are given, there was without exception relief of inflammation within a few hours, followed by fall of temperature and complete restoration of well-being within a few days. Such symptoms as neuritis, orchitis, bone pains, arthritic pains, hypotension cleared up rapidly. Tolerance was "magnificent" and there were no complications. *Ernest Muir*

HELMINTHIASIS

*In this section abstracts are arranged as far as possible in the following order:—*Trematodes *(schistosomes, other flukes);* Cestodes *(Diphyllobothrium, Taenia, Echinococcus, other cestodes);* Nematodes *(Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.).*

Corbo, S. & Ricci, M. Accrescimento infantile e parassitismo intestinale. [**Infant Growth and Intestinal Parasitism**] *Rendiconti Istituto Superiore di Sanità.* Rome. 1958, v. 21, Pt. 2, 120–25, 1 graph.

The English summary appended to the paper is as follows:—

"Out of 196 children examined (ranging in age from 6 to 11 years), 163 showed intestinal parasites.

"All children were examined from the auxological standpoint according to Correnti's method. Children with oxyuriasis and trichuriasis showed but slight differences of auxological evaluation when compared to healthy children, while among those suffering from giardiasis the number of subjects grown in weight was lower. Children with hymenolepiasis or with these three parasites presented the greatest number of undergrown subjects in relation to both age and weight."

Marill, F. G. Le devenir du foyer algérien de bilharziose urinaire d'Inkermann-Saint-Aimé. [**The Growth of the Focus of Urinary Schistosomiasis at Inkermann-Saint-Aimé, Algeria**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 794–804, 1 map. [11 refs.]

Geographically, the focus is treated in the irrigation system of the plains of the Bas-Chélif. In 1939 a case of urinary schistosomiasis, undoubtedly acquired at Saint-Aimé, was diagnosed. On investigation a high infection rate was found in boys at Saint-Aimé and also a single infected person who worked at the irrigation reservoir at Inkermann. The longest history of haematuria was 4 years. Infection may have been imported either by Senegalese troops or labourers or travellers from Southern Morocco. The focus remained quiescent until 1942, after which until 1948 there was *silence épidémiologique*. From 1948 to 1953, annually increasing numbers of new cases were diagnosed from Saint-Aimé, Inkermann and two other villages nearby, Djaidiya and Hamadena. In 1956 at Inkermann rather more than 10% of schoolchildren were found to be infected, and almost 5% of the population at Djaidiya. At Saint-Aimé, however, no new case was found and the disease appeared to have died out at this, the first infected place of the focus.

In view of the extension of irrigation and the presence of *Bulinus* snails in the canals, infection must be expected to spread through the villages of the Bas-Chélif. The great majority of cases occur in bathers, mostly children; infection has remained minimal in workers employed on the irrigation system.

The points in the canals and reservoir at which infection is acquired are known: the reservoir is now barred to bathers, but it is impossible to prevent bathing all along the 400 km. of the canals. Schistosomiasis has actually died out at Saint-Aimé for two reasons: because *Bulinus* seems to have deserted the canals in the neighbourhood, and because the local children, warned of the danger, no longer bathe. There have been notable variations in the *Bulinus* infestation of the water system in the last 17 years. At first snails were found, though not in great numbers, in many different types of canals. Since then they have disappeared progressively and are found at only a few specific points in the system. Nevertheless, though less abundant than before, *Bulinus* still exists. Measures directed against it may include increase of concrete canals to the exclusion of earth banks, the application of molluscicides and periodical drying of canal sectors. *Bulinus* has been found to disappear every time that a sector has been dried for technical purposes. Drying is a simple operation.

B. B. Waddy

Newsome, J. **Species-Specific Serological Tests for Bilharzia.** *Ann. Trop. Med. & Parasit.* 1958, Mar., v. 52, No. 1, 82–6.

It is generally agreed that the circumoval precipitate (COP) test is the most satisfactory serological method now available for the diagnosis of schistosome infections in the vertebrate host and that, in general, it is considerably more species-specific than other laboratory tests [this *Bulletin*, 1956, v. 53, 613 and 1356]. Two difficulties have arisen in connexion with the carrying out of this admittedly excellent test. Firstly, a proportion of the sera from patients and animals with *Schistosoma haematobium* and *S. japonicum* infections give weak positive reactions when tested against the eggs of *S. mansoni*. Secondly, it is necessary to use live schistosome eggs when carrying out the tests, and existing methods for storing these eggs are not entirely satisfactory, particularly in the case of *S. haematobium*. The present paper is in the nature of an interim report on the results of experiments undertaken in order to overcome these difficulties.

R. M. Gordon

Gillet, J., de Smet, R. M., Wolfs, J. & Delperdange, G. Essais thérapeutiques de la bilharziose expérimentale et humaine à *Schistosoma mansoni* avec les sels d'étain. [**Therapeutic Trials with Salts of Tin for Experimental and Human Schistosomiasis due to** *Schistosoma mansoni*] *Ann. Soc. Belge de Méd. Trop.* 1957, Dec. 31, v. 37, No. 6, 835–40.

8 mice experimentally infected with *Schistosoma mansoni* were treated, 12 weeks after infection, with stannous citrate which was injected intraperitoneally daily for 8 days in a dose of 1·3 mgm. tin per 20 gm. mouse

and then for 4 days with 0·78 mgm. The mice were killed for examination 10–11 days after the end of treatment. At autopsy there was found a pronounced shift of the schistosomes from mesentery to liver compared with their distribution in normal mice; this indicates a moderate anti-schistosomal effect, which is less intense than that of antimony salts.

The clinical trials were made with 17 African adults near Kivu infected with *S. mansoni* and weighing 55–60 kgm. The infections were light and symptomless. The treatment consisted of 3 courses of 8 days with intervals of 8 days between courses; during the courses 2 doses of 2 grammes stannous oxide were given per day, apparently by mouth. The stools were examined daily by direct microscopy and by hatching of miracidia. All the patients continued to pass living eggs throughout treatment and for at least 12 days thereafter. It was concluded that the treatment was ineffective. There were no toxic reactions.

[See also this *Bulletin*, 1955, v. 52, 1205; 1956, v. 53, 775.]

F. Hawking

McMullen, D. B. & Harry, H. W. Observations sur l'épidémiologie de la bilharziose et sur la lutte contre cette maladie. [**Observations on the Epidemiology and Control of Schistosomiasis**] *Bull. Soc. Path. Exot.* 1957, Nov.–Dec., v. 50, No. 6, 901–16, 5 figs.

The campaign against schistosomiasis has three points: health education and hygiene, treatment of patients, and anti-snail measures. Animal reservoir hosts are unimportant in connexion with *Schistosoma haematobium* infections: as regards *S. mansoni*, recent work in Brazil has shown that their importance may not be so slight as formerly supposed, and numerous wild and domestic mammals form an animal reservoir of *S. japonicum*. The relative importance of different mammalian hosts varies from place to place. In Formosa a cycle of infection is maintained without necessary participation of human infections, but in Leyte man is the principal mammalian factor in the cycle.

Even fully satisfactory disposal of human faeces, which cannot often be achieved, does not by itself constitute an effective campaign against *S. japonicum* schistosomiasis. Treatment of human cases, too, probably has little or no effect on snail infection rates; nor are truly satisfactory drugs available. Most efforts at control in the last 10 to 15 years have been directed therefore against the snail. Molluscicides have been used by the authors with partial and temporary success, but permanent elimination of the snail hosts of *S. japonicum* has never been achieved, and it appears that the same applies in foci of *S. haematobium* and *S. mansoni* infections. Residual infections in man and other animals rapidly reinfect the regenerated snail population. The biology and ecology of the snail must be studied in the hope of finding practical control measures to supplement those already developed. Molluscicide applications must be repeated, without doubt, for at least a generation. For prolonged molluscicide

application, either of sodium pentachlorophenate or copper sulphate, a long-term low concentration may be applied continuously, with or without a preliminary high concentration application. Alternatively, either molluscicide may be applied thrice yearly. A single annual application permits regeneration of the snail population. In a natural, polluted water a copper ion concentration of about 0·1 part per million is critical for any long term application. 10 parts per million of sodium pentachlorophenate, applied thrice yearly, has been found in Egypt to give satisfactory control, though never elimination of the snail.

Other possible methods of disturbing snail ecology in canals are suggested: varying currents, cementing walls, conversion into tunnels, and the introduction of natural enemies. *B. B. Waddy*

Hsü, H. F. & Hsü, S. Y. L. **On the Size and Shape of the Eggs of the Geographic Strains of** *Schistosoma japonicum*. *Amer. J. Trop. Med. & Hyg.* 1958, Jan., v. 7, No. 1, 125–34, 2 figs.

The strain complex of *Schistosoma japonicum* has become a subject of increasing interest. Different geographical strains have different infectivity against intermediate hosts, *Oncomelania* spp. [Hunter *et al.*, see this *Bulletin*, 1953, v. 50, 226; DeWitt, *ibid.*, 1955, v. 52, 381]. The Formosan strain of *S. japonicum* cannot develop to maturity in man [*ibid.*, 1957, v. 54, 314] and the Formosan monkey, *Macaca cyclopis*, is usually refractory to it [*ibid.*, 1956, v. 53, 1360]. Morphological variations in the number and arrangement of testes, and hermaphroditism in the male worms, have been found in different strains (Hsü and Hsü, *J. Parasitology*, 1957, v. 43, 456; this *Bulletin*, 1958, v. 55, (65)).

The size and shape of the eggs of a parasite are usually regarded as important diagnostic characteristics and it is possible to differentiate between some of the closely related schistosomes of Africa in this way. The present investigation was undertaken to determine whether similar differences exist between the *S. japonicum* strains.

The measurements of the eggs from dogs, cats, hamsters and albino mice infected with the Chinese, Formosan, Japanese and Philippine strains were compared, and significant inter-strain differences were found. In certain cases, variations were found in the eggs in different hosts, and therefore interstrain comparison should be made on eggs from the same host species. [The data and their analysis are given in full.]

" On the basis of egg measurements, Alves (1949) [this *Bulletin*, 1950, v. 47, 375] reported that there are two distinct strains of *S. haematobium* in Africa. The eggs of the West African Sudanese strain are closely related to those of *S. mattheei* while the eggs of the Rhodesian strain are not. Amberson and Schwarz (1953) [*ibid.*, 1954, v. 51, 394] reported that there was a higher percentage of short, broad eggs among those from *S. haematobium* in Egypt than from this parasite in South East and

South Africa. On the basis of this and of the difference in the snail host, they went so far as to create a number of subspecies for *S. haematobium* in Africa. A new variety of *S. mansoni*, i.e., *S. mansoni* var. *rodentorum*, has been described from wild rodents in the Belgian Congo mainly on the minor morphological differences of the eggs (Schwetz, 1953) [*ibid.*, 1954, v. 51, 72]. The present study indicates that the four strains of *S. japonicum* show similar differences.

"As mentioned in another paper (Hsü and Hsü, 1957) [*loc. cit.*], we believe that there is no indication that the Chinese, Japanese and Philippine strains, all anthropophilic, are more closely related to one another than to the Formosan, the zoophilic strain. The results of the present study indicate that insofar as the size and shape of eggs are concerned, all four strains are distinct and can be distinguished from one another. Although all four strains may have originated from one ancestral stem, each strain has developed its own characteristics."

W. E. Kershaw

Su, Tsu-Fei & Ch'en, Nai-Pin. **Schistosomiasis in Children.** *Chinese Med. J.* Peking. 1958, Apr., v. 76, No. 4, 361–75, 1 fig. [31 refs.]

454 children, under 12 years of age, admitted to the Shanghai Children's Hospital between June 1949 and December 1955, were found to be suffering from schistosomiasis [*Schistosoma japonicum*]. The stages of the disease seen in them could be classified as follows:—(a) acute infective (fulminating, severe, or mild)—33 cases; (b) acute reinfective (fulminating, severe, or mild)—105 cases; (c) chronic active (mild reinfection following one of the foregoing)—136 cases; (d) chronic (with slight or moderate fibrotic changes)—66 cases; and (e) symptomless—43 cases. Another 71 children, in addition to schistosomiasis, suffered from complicating conditions such as typhoid, malaria, dysentery, tuberculosis and other infections.

The incubation period in the 33 children in group (a) was almost invariably under one month; that in the others was 4 to 6 weeks; only 4 children had incubation periods exceeding 2 months. All the children, with the exception of those in group (e), were in a poor nutritional state, all had fever at least of some degree. Group (a) patients had symptoms suggestive of other severe infective conditions such as malaria, typhoid or tuberculosis. In these cough was common (64% of cases); liver enlargement with tenderness was usual (88% of cases); diarrhoea (33%) was of secondary importance. Group (b) patients suffered even more severe and diverse symptoms, which included oedema, oliguria and vomiting. Cough (45%) was common and dysenteric diarrhoea (47%) was prominent. Group (c) patients presented a more uniform clinical picture and were therefore more readily diagnosed. The manifestations were cough (28%), dysentery (74%), liver enlargement (65%), and spleen enlargement (33%). Group (d) patients had suffered from their disease

for 2 or 3 years without severe exacerbations and the diagnosis in their case was usually easy.

In all cases stools were examined by smear, concentration, and hatching techniques; these between them, especially the hatching test, usually proved the infection in all but group (d) chronic cases; in these rectal biopsy was often also necessary.

335 patients were treated with antimony potassium tartrate, 21 with Fuadin, 1 with antimony sodium gluconate, and 2 with Solustisin [not described]. Tartar emetic treatment proved the most satisfactory, and the proportion of patients whose stools subsequently were free from eggs was in direct relationship to the amount of the drug given. A total of 25 to 30 mgm./kgm. of body weight of the drug was the safest practicable dosage. Severe systemic and circulatory reactions were the most dangerous resultant toxic side effects. Schistosomiasis complicated by other infections, such as malaria, typhoid, or the dysenteries, should be treated only after these complicating conditions have been dealt with.

A. R. D. Adams

Tsen, Yea-Lin & Ting, Kuang-Sheng. [**Studies on Antibilharzial Drugs. XII. Prophylaxis and Treatment of Schistosomiasis Japonica with Rosaniline** *per os*] Reprinted from *Acta Physiologica Sinica*. 1958, Mar., v. 22, No. 1, 60–66, 1 fig. [20 refs.] [In Chinese.]

The English summary appended to the paper is as follows:—

"(1) When the feeding of rosaniline in a concentration of 0·33% in the diet to white mice *ad libitum* was started 1 day before infection and continued for 26 days, the number of worms was markedly reduced. If the aqueous solution of its HCl salt was fed by stomach tube to rabbits since the day of infection, at the dosage of 0·2 g/kg/day for 14 days or at the dosage of 0·1 g/kg/day for 25 days, the number of worms was likewise reduced remarkably.

"(2) Rosaniline possessed certain inhibitory action on *Schistosoma japonicum* at various stages of development within its definitive host. This inhibition appeared to be more effective during the period of sexual maturity of the worms.

"(3) For treatment of schistosomiasis japonica with 0·33% rosaniline-diet for 3–4 weeks in mice or with 0·6% rosaniline-diet for 5–7 weeks in rabbits, the number of worms was significantly diminished, the hepatic shift increased and the pairing set apart. The body of the remaining worms dwindled and the reproductive organs atrophied, which gradually recovered after rosaniline was discontinued for 1–2 weeks.

"(4) In conclusion, rosaniline exhibited certain therapeutic effect as well as some inhibition on the growth of *S. japonicum*. Its mechanism of action has been discussed, which seemed to be probably different from that of antimonials."

Tsen, Yea-Lin & Ting, Kuang-Sheng. [**Studies on Antischistosomal Drugs. XIII. Screening of 21 Drugs given internally for Prophylaxis against Schistosomiasis Japonica in Mice**] Reprinted from *Acta Physiologica Sinica*. 1958, Mar., v. 22, No. 1, 67–70. [In Chinese.]

The English summary appended to the paper is as follows:—

"Basing on the number and the developmental state of schistosomes in mice, Sb-1 was the best among the 21 compounds tested for the prophylactic effect. Next came Sb-11 and Sb-19, and the third rank was given to Sb-7 and Sb-8. All the rest exhibited no significant protection. The worms were affected by Sb-1 and Sb-11 chiefly during the period of sexual maturity."

Lingard, W. F., Huestis, D. W. & MacLean, J. T. **Carcinoma of the Liver with Clonorchiasis. Report of a Case presenting as Hematuria and Metastasis to Renal Pelvis.** *Arch. Pathology*. 1958, May, v. 65, No. 5, 570–73, 3 figs. [11 refs.]

Greenberg, A. E. & Dean, B. H. **The Beef Tapeworm, Measly Beef, and Sewage—a Review.** *Sewage & Indust. Wastes*. Wash. 1958, Mar., v. 30, No. 3, 262–9. [34 refs.]

The authors draw attention to the almost world-wide economic losses resulting from the infection of cattle with the larval forms of *Taenia saginata*. They point out that the present sewage treatment is inadequate to prevent these losses and, in a review of the literature, draw particular attention to the work of Griffiths [this *Bulletin*, 1951, v. 48, 660] regarding the high incidence of *Cysticercus bovis* infections in cattle in Britain, and of Silverman and Griffiths [*ibid.*, 1956, v. 53, 622] concerning the propagation of the infection by the infected droppings of birds. *R. M. Gordon*

Peraita, P. & Pozo, L. Epiduritis cervical por quiste hidatídico muscular paravertebral supurado. [**Cervical Epiduritis from a Suppurating Hydatid Cyst in the Paravertebral Muscles**] *Cirugia*. Madrid. 1958, Jan.–Mar., v. 4, No. 15, 78–83, 2 figs.

McFadzean, J. A. & Smithers, S. R. **Action of Piperazine on *Necator*, *Trichuris* and *Strongyloides*.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 52, No. 3, 235–6.

"Piperazine adipate was administered in five cases of *Necator americanus* infestation, in five cases of *Trichuris trichiura* infestation, and in five cases of *Strongyloides stercoralis* infestation.

"It appears that piperazine has some action against *Necator* when repeated doses are given, but no action against *Trichuris* or *Strongyloides*."

i. Tanaka, S. [**Studies on the Efficacy of Sodium Dehydrocholate in excluding Foreign Matter from the Biliary Tract. 1st Report: A Study on the Efficacy of Dehychol as a Bile Secretion Promoter**] *Hirosaki Med. J.* 1957, Dec. 30, v. 8, No. 4, 694–702, 8 charts. [56 refs.] [In Japanese.] English summary *115.

ii. ————————. [**2nd Report: Experimental Studies on excluding *Ascaris* Eggs**] *Ibid.*, 703–8. [11 refs.] [In Japanese.] English summary *116–17.

i. Sodium dehydrocholate promotes the secretion of bile and the author, in Hirosaki, Japan, studied its effect in clearing the biliary tract of foreign material such as *Ascaris* eggs, cuticles of dead adult worms, or inflammatory products.

10 patients who had had cholecystectomy had T-tubes placed in the common bile duct. 4 to 10 days after operation the bile was taken 4 times every hour and its volume, bilirubin content and viscosity were measured. Intravenous injection of sodium dehydrocholate in the form of 10% Dehychol (Tanabe) was made and the bile examined similarly over a period of 2 hours. In other experiments, morphine, atropine or pilocarpine were injected subcutaneously in combination with Dehychol.

The injection of Dehychol resulted in a sudden increase of bile secretion, reaching its peak in 15 to 30 minutes: with this increase, the bilirubin content and the viscosity of the bile decreased. When morphine was also used, the increase was not so marked as when Dehychol was used alone, but the bile secretion lasted for a long time; with atropine, the increased secretion was very slight, but with pilocarpine it was marked. In all 3 cases, the decrease in bilirubin and viscosity were almost the same as when Dehychol was used alone.

The experiments suggested that Dehychol is very efficient in clearing the biliary tract, as it secretes a large amount of diluted bile and causes a great decrease in viscosity. There was no harmful effect on the bile secretion seen when Dehychol was used with the 3 common drugs mentioned above.

ii. The use of Dehychol was applied to attempts to clear the biliary tract of *Ascaris* eggs. 43 healthy dogs were injected in the biliary tract with about 20,000 *Ascaris* eggs in saline. Dehychol was then given intravenously at a dose of 0·5 cc./kgm. to some of the dogs and the dogs were killed at stated times thereafter. The *Ascaris* eggs remaining in the gall bladder and common bile ducts were examined and the results compared with those in dogs not injected with Dehychol.

When the eggs were injected by the transpapillary route through a tube in the common bile duct, all were cleared from the bile in the gall bladder within 3 weeks. Some of the eggs in the mucosa remained for about a month. Eggs were cleared earlier from the common bile duct, namely between 2 and 3 weeks. Similar results were obtained when the eggs were infused into the gall bladder, except that eggs were cleared

rather earlier from the common bile duct, namely in 1 week. When transpapillary injection of eggs was made after removal of the gall bladder, these were removed very rapidly—within 3 to 7 days. When Dehychol was given after injection of the eggs, clearance was more rapid: irrespective of the route of injection, the eggs disappeared towards the end of the 2nd week. [In the English summary this is given as ". . . eggs remained for two weeks after the injection; but they disappeared completely as the third week came nearer".]

The author concludes that sodium dehydrocholate is to be recommended for excluding foreign material, especially remaining *Ascaris* eggs, from the biliary tract. A better result may be expected if the drug is applied after cholecystectomy. *H. J. O'D. Burke-Gaffney*

Lin, Liang-Ch'eng & Ch'en, Kuei-Kuang. **Certain Epidemiologic Features of Filariasis in Foochow.** *Chinese Med. J.* Peking. 1958, May, v. 76, No. 5, 490–96, 1 fig.

Three different areas of Foochow, an endemic centre of filariasis, were selected for a survey of the disease and of its possible relation to fluorosis. They were chosen as representing the densely populated urban area, the less dense area of suburban villages, and the least dense mountainous area. The effect of fluorosis was investigated in villages on the east side of the city.

Thick blood films were taken between 9 p.m. and 1 a.m. Mosquitoes were kept until blood meals were digested, before dissection. *Wuchereria bancrofti* was the prevalent species. 3 subjects with *W. malayi* infections were encountered, but all were recent immigrants from elsewhere. Out of a total of 9,045 examinations 8·49% were positive, rates in the different areas being: urban 9·11%, rural 7·40% and mountainous 5·24%. Infection rates were slightly higher in males: incidence was low in childhood, rose to a peak in the 20–49 age-group and thereafter declined. Farmers accounted for 94·35% of the total positive cases. Infection rates among persons who did or did not use mosquito nets were respectively 6·16% and 9·28%. *Culex fatigans* was the only mosquito species found infected, in 4·88% of 1,514 dissections. A few specimens of *C. vagans*, *C. tri-taeniorhynchus* and *Armigeres obturbans* were all negative on dissection. The human infection rate was proportional to the number of microfilariae harboured in each mosquito rather than to the mosquito infection rate.

Fluoride poisoning, manifested by a 38·25% incidence of mottled teeth, was found to be a serious condition in certain districts. In the non-fluorosis area the average fluoride content of water was 0·22 parts per million, but in the fluorosis area figures as high as 7·5 parts per million were found. It was tentatively concluded that chronic fluoride poisoning had no effect on *W. bancrofti* infection. *B. B. Waddy*

March, H. N. & Laigret, J. **The Effect of Cortisone and Prednisone on Bullous Reactions following Treatment of Filariasis with Diethylcarbamazine.** *Amer. J. Trop. Med. & Hyg.* 1958, Mar., v. 7, No. 2, 185–6.

During the treatment of filariasis with diethylcarbamazine (Hetrazan) a bullous eruption involving one or more limbs may occur in 1% of patients. It appears 3–30 days from the beginning of treatment and is painful and incapacitating. The whole limb becomes oedematous, and the patient has a febrile reaction. The reaction does not subside for at least 2 weeks and secondary bacterial infection often occurs, which prolongs the illness.

8 patients with this reaction were seen when symptoms had existed for 1–14 days (average 5). They were treated with 25 mgm. cortisone acetate injected intramuscularly on alternate days plus 15 mgm. prednisone by mouth daily for a total of about 4 days (6 patients) or by prednisone 60 mgm. during 2 days (2 patients). Symptoms improved in 24 hours and subsided completely in 48 hours. It is considered, however, that if there is bacterial infection, corticosteroids should be given with extreme caution, and the infection should be treated with antibiotics.

[This is a curious reaction to occur during treatment with diethylcarbamazine and it has not been reported from other areas where filariasis occurs.] *F. Hawking*

Scott, J. A. & Macdonald, Etta M. **Immunity to Challenging Infections of *Litomosoides carinii* produced by Transfer of Developing Worms.** *J. Parasitology.* 1958, Apr., v. 44, No. 2, 187–91.

Lavoipierre, M. M. J. **Studies on the Host-Parasite Relationships of Filarial Nematodes and their Arthropod Hosts. I.—The Sites of Development and the Migration of *Loa loa* in *Chrysops silacea*, the Escape of the Infective Forms from the Head of the Fly, and the Effect of the Worm on its Insect Host.** *Ann. Trop. Med. & Parasit.* 1958, Mar., v. 52, No. 1, 103–21, 14 figs. & 2 pls. [24 refs.]

In this interesting paper the author describes certain aspects of his investigations concerning the migration and escape of the infective forms of *Loa loa* from the vector *Chrysops* and their effect on the arthropod host. The ingested microfilariae, having bored through the gut wall into the coelom, individually invade cells of the fat-body (the oenocytes being selected in preference to the true adipose cells), thus establishing that *Loa*, like other species of filarial worms, is an intracellular parasite in the early stages of its development. This development causes a considerable degree of disorganization of the fat-body, and the subsequent growth of the larvae causes these relatively large helminths to burst out of the

confines of the cell, after which the infective forms migrate from the abdomen to the thorax by way of the narrow abdomino-thoracic junction. " Through the neck, the helminths travel to the head either via a large ventral cervical haemocoelic canal or by squeezing between the oesophagus, the ventral nerve-cord and the cervical tracheal trunks. By whichever portal of entry the worms enter the head, they find their way to a large haemocoelic space . . . which lies posterior to the cibarium.

" It is believed that, though some infective forms may emerge from the individual elements of the mouth-parts while the fly is taking in a blood-meal, most of them probably escape by rupturing the delicate labio-hypopharyngeal membrane which is reflected from the root of the labium on to the underside of the hypopharynx.

" It is suggested that the mechanism of emergence of the worms is dependent on events which occur while the fly is taking in a blood-meal. As the fly drives its biting fascicle into the skin, the labium is retracted into the head, with the result that the labio-hypopharyngeal membrane is stretched. Almost immediately afterwards, the stomach fills with blood, displacing the gaseous contents of the abdominal air-sacs and the haemolymph forward towards the head and thorax. With the labio-hypopharyngeal membrane stretched by the indrawn labium, it is conceivable that the increase in intracranial pressure, together with the active movements of the worms, brings about a rupture of the membrane."

From these investigations emerge certain important facts which add considerably to our knowledge not only of the development of the filarial worms in the fly and their pathogenic effects on its life, but also add to the existing knowledge of the internal anatomy of tabanid flies. In the first place, the author demonstrates that the course of development is not in the nature of mere indiscriminate tunnellings through the fly's tissues, but that the filariae pursue definite anatomical paths just as do the migratory forms of certain helminth parasites in the vertebrate host. Secondly, he shows that these migrations produce what may be regarded as pathogenic lesions in the fat-body, thoracic muscles and, possibly, in the ocular apparatus, while the escape of the infective forms from the feeding fly may shorten its subsequent life span.

As regards the assistance given to an understanding of the internal anatomy of tabanid flies, the author points out that " the helminths themselves served as tracers of the haemocoelic system of the insect . . . and so contributed to an understanding of the fly's anatomy ".

This is an important paper which should be consulted in the original by all workers interested in that aspect of filariasis which deals with the relationship between the vector and parasite. *R. M. Gordon*

See also p. 1048, D'Haussy *et al.*, Contribution à l'étude des lésions du fond d'oeil dans l'onchocercose. [**Study of Lesions of the Fundus of the Eye in Onchocerciasis**]

Blanc, M., d'Aubenton, F., Ovazza, M. & Valade, M. Recherches sur la prophylaxie de l'onchocercose en A.O.F. I. Étude hydrobiologique de la Bougouri-Bâ et essais de désinsectisation. [**Studies on the Control of Onchocerciasis in French West Africa. I. Hydrobiological Study of the Bougouri-Bâ River and Trials with Insecticides**] *Bull. Inst. Français d'Afrique Noire.* 1958, Apr., v. 20, No. 2, 634–74, 12 figs. on 6 pls. & 6 text figs. [28 refs.]

The River Bougouri-Bâ, at least 400 kilometres long, runs approximately eastwards in French West Africa (Ivory Coast) from near the town of Bobo-Dioulasso to join the Black Volta near Manoa. Work on the ecology of the river, with special reference to breeding and control of *Simulium* spp., is recorded in this paper. Seasonal fluctuations in flow occur. In parts this is insufficient to maintain breeding and no adult *Simulium* are found biting in the dry season. Elsewhere on the river course adults occur all the year. Onchocerciasis is endemic in the country traversed by the river, which consists of shallow rapids for parts of its length with intervening deeper, calmer waters. Besides various physical and chemical characteristics analysed (*p*H, hardness, carbonates), water temperature is noted to range from 25° to 32°C. Of the 59 species of fish present several are important to the Africans as food.

8 species of simuliid were found as larvae, 4 of these only in tributaries of the Bougouri-Bâ. Only *S. damnosum*, *S. adersi*, *S. griseicolle tridens* and *S. schoutedeni* were taken in the dry season in the main river, the first 2 species commonly together. *S. medusaeforme hargreavesi* larvae could persist in the natural presence of a green alga on substrates, but not *S. damnosum* or the other species.

From dry-season studies, it is concluded that non-biting female flies, resting in diapause, maintain the fly population when breeding is low or ceases. Expectations of breeding through the dry season vary from one year to another, depending on residual dry season flow (locally) related to the amount of the previous rains. It is conceded that immigrant females may repopulate with the rains an area free from flies in the dry season; but the authors found no evidence to support the view that drought-resistant egg-masses of *Simulium* exist.

Trials in the application of DDT as an anti-larval measure showed that (1) 4 to 8 p.p.m. for 2 hours was apparently harmless to fish when used as a dispersible powder, (2) 2·5 p.p.m. of a 17% DDT solution in kerosene was fully effective also, although some small fish were killed by, it is concluded, accumulation of kerosene in slack waters. Earlier work [this *Bulletin*, 1956, v. 53, 1160] has indicated that lindane is dangerous to fish [but see also *ibid.*, 1958, v. 55, 339]. For practical convenience DDT-dispersible powders are not recommended for large-scale control; a liquid solution of DDT is desirable, but preferably not in kerosene or other similar solvent liable to kill fish. The effectiveness of the insecticide ceased when the river flowed in deep, calm stretches of more than 500 to 1,000 metres in length. *D. S. Bertram*

DEFICIENCY DISEASES

Abdou, I. **A Study of the Pattern and Trends of the Egyptian Diet and their relation to Health.** *J. Egyptian Pub. Health Ass.* 1958, v. 33, Nos. 1/2, 21–32.

This paper gives the annual food supply of the population of Egypt from the years 1947/48 to 1954/55. Calories per head have increased from 2,364 to 2,572, total protein from 68·4 to 73·8 gm. and animal protein from 9·4 to 11·0 gm.

The ratio of wheat to maize consumed has changed from 0·75 to 1·1 during the 6 years. This decreased maize consumption should have a favourable effect on the incidence of pellagra.

The pattern and trends of diet in Egypt are discussed and compared with estimated requirements. The findings are set out in 4 tables.

R. Passmore

Pathak, C. L. **Nutritional Adaptation to Low Dietary Intakes of Calories, Proteins, Vitamins, and Minerals in the Tropics.** *Amer. J. Clin. Nutrition.* 1958, Mar.–Apr., v. 6, No. 2, 151–8, 2 figs. [38 refs.]

This paper compares the results of a dietary and clinical survey on 80 medical students and 160 street beggars in an Indian city. The chemical composition of the diets of the beggars was inferior to that of the students and far below acceptable physiological standards. Yet in the great majority of beggars (94%) on clinical examination there was no evidence of nutritional deficiency diseases. It is concluded that a "nutritional adaptation" to a prolonged low dietary intake takes place, which "may function by exercising a very rigid internal economy".

[The difficulties in carrying out a dietary survey on beggars are obviously great. The author discusses these and has been at pains to overcome them as far as possible. Yet the results of the survey must be open to suspicion and it is doubtful if the conclusion can be justified.]

R. Passmore

Gitlin, D., Cravioto, J., Frenk, S., Montano, Evangelina L., Ramos Galvan, R., Gomez, F. & Janeway, C. A. **Albumin Metabolism in Children with Protein Malnutrition.** *J. Clin. Investigation.* 1958, May, v. 37, No. 5, 682–6, 3 figs. [12 refs.]

"The metabolism of serum albumin was studied in 14 children with severe protein malnutrition, using I^{131}-labeled albumin as a tracer. The half-life of albumin in these children during the hypoalbuminemic period did not change when the serum albumin concentration rose to normal values. Hypoalbuminemia in these children with low protein intakes appears to be due primarily to a decreased rate of albumin synthesis."

Poey Seng Hin. Kwashiorkor di Djakarta dan sekitarnja (gambaran klinik). [Thesis.] [**Kwashiorkor in the Djakarta Region**] 219 pp., numerous illustrations. [Numerous refs.] English summary. 1957. Djakarta: P.T. Penerbitan Universitas.

In this thesis, submitted to the University of Indonesia, the author reviews the literature on kwashiorkor and then discusses in very great detail the clinical features of 183 cases from Djakarta and its suburbs.

The author considers that the clinical pattern of kwashiorkor in Djakarta satisfies the diagnostic requirements of the Joint FAO/WHO Expert Committee on Nutrition [this *Bulletin*, 1954, v. 51, 626], except that the Djakarta series showed more signs of vitamin A deficiency and of gangrenous stomatitis than are usually seen in other countries.

A full English summary of 6 pages gives a useful account of this study in some detail. *H. J. O'D. Burke-Gaffney*

Schnieden, H., Hendrickse, R. G. & Haigh, C. P. **Studies in Water Metabolism in Clinical and Experimental Malnutrition.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, Mar., v. 52, No. 2, 169–75, 2 figs. [30 refs.]

In 18 children aged 2 to 4½ years suffering from kwashiorkor, there was an impaired renal response to ingested water, as judged by Fishberg's test. After treatment 7 children were retested: all gave a greater response and in 5 this was within the normal range.

The virtual deuterium space (total body water) in healthy children was found to be 64·5% of body weight and in 10 children with kwashiorkor 80·5% of body weight.

Adult rats kept on a diet of cassava for 15 weeks lost weight and had an impaired renal response to water.

Possible mechanisms responsible for the diminished renal excretion of water are discussed. *R. Passmore*

Burch, Helen B., Arroyave, G., Schwartz, Ruth, Padilla, Ana M., Béhar, M., Viteri, F. & Scrimshaw, N. S. **Biochemical Changes in Liver associated with Kwashiorkor.** *J. Clin. Investigation.* 1957, Nov., v. 36, No. 11, 1579–87. [33 refs.]

The authors describe the results of biochemical assay on liver biopsies from Guatemalan children with kwashiorkor. 4 cases were severe, the others moderate. 2 children died in hospital. All showed hair changes, skin lesions and oedema. All were apathetic and had diarrhoea. Analyses were made in the liver samples of xanthine, D-amino acid and glycolic acid oxidases, DPNH [diphosphopyridine nucleotide reduced] and malic dehydrogenases, transaminase, riboflavin, total oxidized pyridine nucleotides, cholesterol, lipid and protein; of protein, cholinesterase and

amylase in the serum; and of riboflavin in erythrocytes. Samples were taken from 13 children, in 6 before and after treatment. Control analyses were made from liver specimens taken at autopsy from children dying of causes unrelated to kwashiorkor. The possible necropsy changes resulting from post-mortem delay were studied in rats at various times after death.

In 6 children hepatic flavine enzyme systems were studied before and after treatment. Calculated on a basis of liver protein, there was no significant change in riboflavine; glycolic acid oxidase was reduced in one case; DPNH-dehydrogenase was little changed. The only low value for DPNH-dehydrogenase was obtained in a fatal case. The authors suggest that this may indicate that this enzyme is one of the most crucial of the flavine group. The xanthine oxidase in all and D-amino acid oxidase in 5 cases rose considerably with treatment. Very low levels possibly due to irreversible changes in the liver were obtained in one child who failed to respond to treatment and died 4 days after admission.

The authors note that D-amino acid oxidase in rats is not so greatly affected by low dietary protein or calories as is xanthine oxidase. The former may thus not respond in children in the same way as in rats.

Liver protein increased on an average by 38% during treatment, and total lipid fell to less than one-third of the initial value. There was no significant change in cholesterol. Transaminase and malic acid dehydrogenase remained unchanged.

There was a significant rise in serum protein on treatment accompanied by a rise in serum cholinesterase. Comparison of increases in serum protein and cholinesterase with that in liver protein suggests simultaneous regeneration.

Serum amylase was not significantly increased.

Erythrocyte riboflavine increased despite the unchanged liver content.

In the controls, all apparently well nourished, xanthine oxidase and glycolic acid oxidase were higher than in children with kwashiorkor after treatment but other values were of the same order.

In the rat liver analyses none of the enzymes was diminished significantly within 6 hours of death. *B. G. Maegraith*

Wells, R. **Nutritional Vitamin B_{12} Deficiency.** *J. Trop. Med. & Hyg.* 1958, Apr., v. 61, No. 4, 81–92, 1 fig. [Numerous refs.]

SPRUE

Gardner, F. H. **Tropical Sprue.** *New England J. of Med.* 1958, Apr. 17 & 24, v. 258, Nos. 16 & 17, 791–6; 835–42, 8 figs. [52 refs.]

A general review and discussion.

Butterworth, C. E., Jr., Nadel, H., Perez-Santiago, E., Santini, R., Jr. & Gardner, F. H. **Folic Acid Absorption, Excretion, and Leukocyte Concentration in Tropical Sprue.** *J. Lab. & Clin. Med.* 1957, Nov., v. 50, No. 5, 673–81, 4 figs. [18 refs.]

The authors studied cases of untreated sprue and relapsing sprue (diarrhoea, glossitis, weight loss, megaloblastic bone marrow and malabsorption of two or more of the test substances, xylose, vitamin A, butter, dietary fat), and cases of treated sprue (clinical history of diarrhoea, glossitis and anaemia with response to therapy, or of previous relapse).

The urinary excretion after oral or intravenous administration of 5 mgm. folic acid was examined in 38 treated patients, 18 untreated patients and 35 normal subjects. The untreated patients excreted only 1·2% of the oral dose and 27% of the intravenous dose. The figures for treated and normal subjects were approximately the same (26% and 40% respectively for normal subjects). In 4 patients the effects of regular folic acid therapy were studied; the excretions after oral test dosage rose from means of 0·6 to 19% and after intravenous dosage from 24 to 29% in 2 months.

Serum concentrations of free folic acid were measured in 9 treated and 3 untreated patients and 2 normal persons. Clearance occurred at the same rate in all. Leucocyte folic acid was low in untreated patients.

Since the urinary assay did not take into account natural metabolites, chromatography and bio-autography were used. These techniques failed to demonstrate in the urine of sprue patients any substance inhibitory to growth of *S. faecalis*.

The authors conclude that in sprue there is marked malabsorption of folic acid, with some reduction of tissue concentrations. Absorption improves with treatment. The malabsorption is not permanent and is not comparable to that of B12 in pernicious anaemia. *B. G. Maegraith*

Oxenhorn, S., Esuren, S., Wasserman, L. R. & Adlersberg, D. **Malabsorption Syndrome: Intestinal Absorption of Vitamin B_{12}.** *Ann. Intern. Med.* 1958, Jan., v. 48, No. 1, 30–38, 1 fig. [28 refs.]

Studies were made in 25 patients with "idiopathic sprue", in 3 patients with "sprue" secondary to resection of the small bowel and in 3 patients with "sprue-like syndrome" associated with blind intestinal loops.

The absorption of B12 was estimated by 24-hour urinary excretion after oral administration of vitamin containing radioactive isotopes of cobalt. Immediately after the labelled vitamin had been given, a dose of 1,000 mgm. non-radioactive B12 was administered intramuscularly or subcutaneously.

Normal persons excreted 9 to 36% (equivalent to an average of about 50% of the oral dose) of ingested radioactivity. In 15 pernicious anaemia patients the range was 0 to 1·2%.

In normal patients in whom the test was repeated after an interval of

a week, with the addition of oral intrinsic factor, excretion was unchanged. In the pernicious anaemia patients it rose to from 6·3 to 30·5%.

The results of the authors' studies are given in a table in which the "idiopathic sprue" cases are called "Primary malabsorption syndrome". In these patients 20 showed marked impairment of intestinal absorption; the range of excretion was 0 to 19%. In 22 patients the absorption was unaffected by oral intrinsic factor. Similar poor absorption with and without intrinsic factor was noted in the "resection" group of patients. Bad absorption was also observed in the "blind loop" patients, 2 of whom improved with antibiotic treatment. *B. G. Macgraith*

Butterworth, C. E., Jr. & Perez-Santiago, E. **Jejunal Biopsies in Sprue.** *Ann. Intern. Med.* 1958, Jan., v. 48, No. 1, 8–29. 8 figs. [33 refs.]

Jejunal biopsies were obtained in 6 patients "with the clinical features of sprue and laboratory-proved malabsorption". 5 patients were multiparous women undergoing bilateral tubule ligation. 1 had had blood transfusion; 4 had had folic acid some time previously. The only male underwent laparotomy for suspected Whipple's disease. Absorption tests were carried out as follows: urinary excretion of xylose 5 hours after oral dosage of 25 gm. D-xylose; serum level of vitamin A at 5 and 7 hours after 300,000 units orally; serum optical density 2–4 hours after a meal containing 30 gm. butter. Faecal fat was measured daily for 12 days in 4 patients.

Control biopsies were obtained from 15 patients, one of whom had developed diarrhoea and megaloblastic anaemia post partum, without absorption defects.

The sprue biopsies showed a considerable decrease in absorptive surface, with widening and coalescence of the villi. The lamina propria showed inflammatory cellular infiltration, mostly with eosinophils and plasma cells. Oedema was present in all patients, sometimes extending to the sub-mucosa.

Goblet cells were increased in 4 cases. There was some inflammatory infiltration of the columnar layer of the epithelium.

In their interesting discussion the authors state:

"The interpretation therefore presents itself that at least some of the pathologic changes observed in jejunal biopsies from sprue patients result from disturbances in the epithelial surface. Either diminished production or shortened survival of columnar cells could, by jeopardizing the integrity of this surface, lead to all the changes noted. It would seem likely that intestinal involvement may be only part of a diffuse process which also affects bone marrow and other tissues. Whatever the underlying disorder, the present study demonstrates that pathologic changes do exist in the small bowel of patients with sprue. The findings suggest the desirability of continued studies with jejunal biopsies." *B. G. Macgraith*

HAEMATOLOGY

CASLEY-SMITH, J. R. **The Haematology of the Central Australian Aborigine. I. Haemoglobin and Erythrocytes.** *Australian J. Exper. Biol. & Med. Sci.* 1958, Feb., v. 36, Pt. 1, 23–37. [48 refs.]

"This paper records haemoglobin values, erythrocyte counts, mean corpuscular haemoglobin values, erythrocyte diameters, and estimates of anisocytosis, non-circularity and mean eccentricity of erythrocytes for a group of Central Australian aborigines as compared with a corresponding group of Adelaide European controls.

"Haemoglobin values in aboriginal males were slightly greater than in European controls. Those in aboriginal females are markedly greater than in European females. Possible explanations are discussed.

"Erythrocyte counts revealed similar but less marked differences. European figures were lower than those accepted elsewhere, but were close to some reported from Sydney.

"Mean corpuscular haemoglobin values for the men were not different but the aboriginal woman had slightly higher values than European women. The Europeans had slightly higher values than most recorded elsewhere, but conformed to the Sydney findings.

"Erythrocyte diameters disclosed no significant sex differences in the aborigines but were slightly greater in European men than women. Aboriginal males showed smaller diameters than European males while those in the aboriginal females were only slightly smaller than in European females. The aborigines showed an increase in diameter with age.

"Anisocytosis was estimated from the variance between cells. The two female groups showed about the same amount but the aboriginal men showed slightly, and European men considerably, less.

"Non-circularity was estimated from the variance within cells. European men showed less than European women, other differences were not significant."

[See this *Bulletin*, 1958, v. 55, 466.]

MCFADZEAN, A. J. S., TODD, D. & TSANG, K. C. **Observations on the Anemia of Cryptogenetic Splenomegaly. I. Hemolysis.** *Blood.* 1958, June, v. 13, No. 6, 513–23, 6 figs. [19 refs.] **II. Expansion of the Plasma Volume.** *Ibid.*, 524–32, 3 figs. [11 refs.]

I. "Excessive hemolysis has been shown to occur in patients with cryptogenetic splenomegaly. This is corrected by splenectomy.

"The survival of normal red cells transfused to such patients is greatly reduced. Following splenectomy normal red cells so transfused survive normally.

"The survival of red cells from such patients upon transfusion to

healthy recipients, including a splenectomized recipient, is greatly reduced. Following splenectomy the survival of red cells from such patients upon transfusion to healthy recipients is significantly increased, although still significantly less than normal. However, upon transfusion into splenectomized but otherwise healthy recipients the survival time is normal.

"Study of osmotic fragility before splenectomy demonstrates the existence of a mixed population showing both increased and decreased fragility to hypotonic saline. Following splenectomy there emerges a population with increased resistance to hypotonic saline.

"It is concluded that prior to splenectomy the pathologic spleen exerts an effect upon circulating erythrocytes including transfused normal red cells which results in marked reduction in their survival. Following splenectomy a second defect in the erythrocytes becomes apparent and this also results in reduction in life-span, although the presence of the spleen would appear necessary for this reduction to occur. It is suggested that this second defect develops as the result of liver damage."

II. "In cryptogenetic splenomegaly, although there is consistently a significant reduction in hemoglobin concentration and in the red cell count, the total red cell volume may be reduced, normal or increased.

"Following splenectomy the total red cell volume is either within normal limits or is increased, yet significant anemia persists.

"Before splenectomy a significant increase in plasma volume is consistently present. Following splenectomy the plasma volume falls, but it remains significantly greater than normal. It would appear that the greater the plasma volume before splenectomy the greater is the fall following splenectomy. This fall in plasma volume is not a prompt response to splenectomy, for the fall which occurs one month after splenectomy is equalled or exceeded by that occurring in the succeeding four months.

"It is concluded that an expanded plasma volume before splenectomy contributes with the hemolysis previously reported to the development of the anemia encountered in cryptogenetic splenomegaly. Expansion of the plasma volume at least contributes to the anemia which persists following splenectomy."

Masri, M. S.; Josephson, A. M.; Singer, K.; Singer, Lily; Dworkin, D. **Starch Block Electrophoretic Studies of Human Hemoglobin Solutions. I. Technic and Results in the Normal Adult** [Masri, Josephson & Singer]. *Blood*. 1958, June, v. 13, No. 6, 533–42, 4 figs. [34 refs.] **II. Results in Cord Blood, Thalassemia and other Hematologic Disorders: Comparison with Tiselius Electrophoresis** [Josephson, Masri, Singer, Dworkin & Singer]. *Ibid.*, 543–51, 1 fig. [22 refs.]

Shukla, R. N., Solanki, B. R. & Parande, A. S. **Sickle Cell Disease in India.** *Blood.* 1958, June, v. 13, No. 6, 552–8, 3 figs. [22 refs.]

"Five cases of sickle cell disease are reported with complete clinical, hematologic and genetic studies. Four were cases of sickle cell anemia and one had sickle cell thalassemia. The importance of the presence of a focus of sickling in this area has been discussed."

Hook, E. W. & Cooper, G. R. **The Clinical Manifestations of Sickle Cell-Hemoglobin C Disease and Sickle Cell Anemia.** *Southern Med. J.* 1958, May, v. 51, No. 5, 610–626, 15 figs. [65 refs.]

This study concerns Negro patients at Atlanta, Georgia, where during 20 months the authors encountered 36 cases of "S-S anemia" and 16 of "S-C disease". [It may be noted that these numbers express fairly closely the relative frequency of the two diseases that would be expected by calculation from the frequency of the S and C genes there.] The mean ages of the two groups were very similar (16 years for S-S and 19 years for S-C cases), as were mean ages at the onset of symptoms (5·4 and 6·0 years, respectively), but patients under 5 years of age were commoner in the S-S group (9 out of 36) than in the S-C (1 out of 16).

Brief clinical notes are given of all the S-C patients, and a full comparison of the two groups is then undertaken. The results are essentially in accord with previous descriptions, and indicate the greater severity of the morbid processes in true sickle-cell anaemia. In the latter group, musculo-skeletal pain occurred in 90% of patients, periarticular swelling in 60%, abdominal pains in 80%, epistaxis in 33%, haematuria in 6%, enlargement of the heart in over 80%, liver enlargement in 66%, tortuous retinal vessels in 88%, and leg ulcers in about 14%. In all these particulars, the incidence in the S-C group was less. Other comparisons are of greater interest: painful swellings of the digits, hands, and feet in the first year of life occurred only in the S-S cases (in 5 such patients), and at any age radial striation on X-ray examination of the skull vault was only seen in the S-S group. The spleen was more often palpable (66%) in the S-C group, and did not decrease in size with advancing age; while it was palpable in only 20% of the S-S patients at the time of examination, and in only 1 of the 15 subjects over 14 years of age. Correspondingly, splenic infarcts were diagnosed twice as often in the S-C as in the S-S group. Target cells formed less than 25% of the erythrocytes of S-S patients, but nearly 100% in some S-C patients. The more severe haemolysis of the S-S cases was reflected in their lower mean Hb levels (8·7 gm.% as against 11 gm.%), and their higher reticulocyte counts during asymptomatic intervals (over 8% as against 3·5%).

The authors conclude: "Although the two diseases follow predictable courses, differentiation is not always possible on the basis of clinical and routine laboratory findings. Electrophoretic study of haemoglobin is

necessary for definitive diagnosis ''. [Their diagnoses were in fact based on electrophoresis; they examined the families of the S-C but not of the S-S patients, and thus do not contribute to the analysis of any genetic differences that might explain why these, like other American cases of sickle-cell anaemia, show a later onset and a longer survival than African cases.] *Alan B. Raper*

Wolff, J. A., Michaels, R. H. & von Hofe, F. H. **Hemoglobin H—Thalassemia Disease.** *Blood.* 1958, May, v. 13, No. 5, 492–501, 10 figs. [17 refs.]

There has been increasing evidence for a correlation of haemoglobin H and of thalassaemia and it has indeed been suggested that the gene responsible for haemoglobin H finds no expression in the phenotype unless there is also present a gene for thalassaemia. The present paper describes haemoglobin H and thalassaemia in a child of Italian extraction. Neither of the parents showed haemoglobin H nor did any of the 4 siblings of the propositus. However, the mother and 2 siblings had evidence of thalassaemia minor. This is the first occasion on which haemoglobin H has been found in an Italian. The other findings have been mostly in Mongoloid subjects though there have been reports of haemoglobin H occurring in Greeks. *H. Lehmann*

VENOMS AND ANTIVENENES

Parrish, H. M. **Ophidiasis—an Unusual Occupational Hazard.** *Indust. Med. & Surgery.* Chicago. 1958, Feb., v. 27, No. 2, 63–6. [14 refs.]

The author gives an account of the incidence of snake bite among those who handle snakes professionally. The histories are summarized of 41 people who had been bitten one or more times (the "record" was 12 times). All except one bite occurred on the extremities, mostly in the upper extremity, in contrast to the anatomical site of snake bite in the general population, which is most commonly the leg. (The exception came from carrying a snake in a bag over the shoulder!) Details of 82 bites are discussed. In all except 3 cases of venenation the snakes responsible were rattlesnakes (*Crotalus* spp.), pygmy rattlesnakes (*Sistrurus* spp.) and the moccasins (cottonmouth and copperhead), in that order. There were no deaths. The distribution of degrees of severity, *i.e.*, minimal, moderate, and severe, among those bitten was the same as in the general population.

Scratch tests to fresh snake venom (type not recorded) were positive in 6 of 32 patients with previous snake bite, and negative in 9 normal

people. 8 patients were sensitive to horse serum; 6 of these had had large doses of antivenene and 5 had had serum sickness. The importance is stressed of skin-testing an individual for hypersensitivity to horse serum before the administration of antivenene.

Prevention of snake bite among professional handlers is discussed. The amount of exposure appears to be the dominant determining factor. No fewer than 6 persons were poisoned by the fangs of dead snakes. Each bite is potentially dangerous. There is no evidence that a previous bite by a pit viper confers permanent immunity. "Many persons handling poisonous snakes may receive bites resulting in either no venenation or minimal venenation and conclude that snakebites are not really dangerous."

[This has recently been pointed out very clearly by Reid, this *Bulletin*, 1957, v. 54, 747.] *B. G. Maegraith*

Russell, F. E., Panos, T. C., Kang, L. W., Warner, A. M. & Colket, T. C. **Studies on the Mechanism of Death from Stingray Venom. A Report of Two Fatal Cases.** *Amer. J. Med. Sci.* 1958, May, v. 235, No. 5, 566–84, 6 figs. [44 refs.]

Atkins, J. A., Wingo, C. W., Sodeman, W. A. & Flynn, J. E. **Necrotic Arachnidism.** *Amer. J. Trop. Med. & Hyg.* 1958, Mar., v. 7, No. 2, 165–84, 17 figs.

A case history of spider bite is given, in which the responsible agent was probably *Loxosceles reclusus*. A white woman was bitten in the left deltoid region. She noticed a reddened area and stinging, followed by intense pain. 12 hours later the blood pressure and respiratory rate were normal; temperature was 99·6°F. and pulse 96 beats per minute. In the left deltoid region was a tender white oedematous central area about 1·5 cm. in diameter surrounded by an irregular zone of "inflammation" [? erythema]. Next day there was extensive extravasation of blood into the local reddened zone. A scarlatiniform rash over the body and extremities appeared and remained for 3 days. The rash was followed by desquamation. The central area of the bite gradually became necrotic and sequestrated, leaving a deep circumscribed ulcer extending down to the muscle. Healing and scarring took 10 weeks. About 12 hours after the bite prednisone 15 mgm. thrice daily was started and continued for a week, the dose being reduced over the following week. No effect was noted.

In the 5 non-fatal cases seen by the authors, severe local pain at the site of the bite was immediate. General symptoms, including fever, lasted about a week. The white blood cell count was sometimes raised. There was sometimes proteinuria. They "found no gross hemoglobinuria".

The significant difference between the clinical picture of this bite and that of the black widow spider is the local necrosis, which is uncommon in the latter. On the other hand these necrotic bites closely resemble the "gangrenous spot" bites reported from Chile (due to *Loxosceles* spp.).

Specimens of *L. reclusus* were collected and kept in the laboratory. Spiders were anaesthetized with carbon dioxide and attached under a loose plastic membrane to the bare skin of animals. Details of the mode of biting were studied. Rabbits were very susceptible to the venom of both sexes of *Loxosceles*. They could be immunized by repeated biting and by injection of venom. In the guineapig local tissue damage at the site of the bite was characterized by haemorrhage, inflammatory cell reaction and, 3 to 4 days later, liquefaction, abscess and finally granulation and scarring. These reactions are illustrated by excellent photographs. *B. G. Maegraith*

TOXOPLASMOSIS

Valentinčič, M. & Banič, S. Naše izkušnje s serodiagnostiko toksoplazmoze. [**Our Experiences with the Serological Diagnosis of Toxoplasmosis**] *Zdravstveni Vestnik*. Ljubljana. 1957, v. 26, No. 11, 448–51.

Between 1954 and 1957 the authors carried out complement-fixation and dye tests for the diagnosis of toxoplasmosis on 545 human sera, mostly from patients in hospitals in Slovenia and other republics of Yugoslavia, and also on the sera of 43 dogs and 1 cat. Positive results in the complement-fixation test were obtained in titres of 16–128 in 18 human and 6 animal sera, and in titres of 2–64 in 184 human sera. The dye test was positive in titres of 250–6250 in 28 human and 6 animal sera, and titres of 10 or higher were observed in 149 and 10 sera respectively. *D. J. Bauer*

de Toni, G. Un caso di probabile toxoplasmosi coniugale. [**A Case of Probable Conjugal Toxoplasmosis**] *Giorn. di Malattie Infettive e Parassit.* 1958, Apr., v. 10, No. 4, 317–18.

This is an interesting description of toxoplasmosis in husband and wife. In the man, aged 31, disturbance of vision in one eye had been present from the age of 15, which for 3–4 years gradually worsened and then became stabilized for 5 years; at the age of 24 disturbance of vision began to occur in the other eye. The patient suffered from hemiparesis, increased knee reflexes, dizziness. The Sabin test was positive at 1 in 120 and on the basis of this, the retinal appearances and the paresis, the diagnosis of toxoplasmosis was made.

On one attendance at the clinic he was accompanied by his wife who complained of tiredness and dizziness, but no visual disturbance. After 5 years of marriage she had had 2 abortions but no children. A Sabin test was positive first of all at 1 in 64 (borderline) and subsequently at 1 in 265 which was definitely pathological.

The origin of the diagnosed toxoplasmosis in her case was considered to be conjugal though there was no evidence as to how the infection occurred. Treatment in both cases was by Daraprim [pyrimethamine] tablets to which in the man prednisone and sulphadiazine were added. The symptoms were clearing up when the case was reported.

W. K. Dunscombe

DERMATOLOGY AND FUNGUS DISEASES

See also p. 1058, Favorite, **The Imported Fire Ant.**

Goldschmidt, E. P. & Taylor, G. W. **Nutritional Requirements for the Growth and Arthrospore Formation of** *Coccidioides immitis*. *J. Bacteriology*. 1958, Mar., v. 75, No. 3, 265–71, 7 figs.

"The nutritional requirements for growth and arthrospore formation of *Coccidioides immitis* strain Cash have been studied. Yields of approximately 3 billion viable particles per ml and approximately 9 mg cellular protein per ml (approximately 40 g dry weight per L) were obtained after 7 days incubation in a synthetic medium consisting of glucose, ammonium lactate, and inorganic salts. The Cash strain gave higher yields than 12 other strains of *C. immitis* in this medium.

"The results suggested that high concentrations of ammonium lactate and iron and high pH were inhibitory for fragmentation but not for growth. There were higher requirements for potassium, zinc, and magnesium for maximum viable count (fragmentation) than for maximum growth."

The composition of the medium was:—

Component	Amount per 1000 ml.	
	g	*mM*
Glucose *	100·0	555·0
Lactic acid	20·0	222·0
NH_4OH, concentrated	(14·75 ml.)	222·0
KH_2PO_4	3·0	22·0
K_2HPO_4	1·0	5·75
K_2SO_4	2·0	11·5
$MgSO_4 \cdot 7H_2O$	0·5	2·0
$ZnSO_4 \cdot 7H_2O$	0·04	0·139
$FeSO_4 \cdot 7H_2O$	$1·5 \times 10^{-3}$	$5·4 \times 10^{-3}$
$MnSO_4 \cdot H_2O$	$0·77 \times 10^{-3}$	$4·5 \times 10^{-3}$
$CaCl_2 \cdot 2H_2O$	$0·73 \times 10^{-3}$	$5·0 \times 10^{-3}$

* Glucose sterilized as 40% solution by autoclaving and added aseptically to the medium. *p*H of medium after autoclaving = 5·3 to 5·5.

Huppert, M. & Walker, Leila J. **The Selective and Differential Effects of Cycloheximide on Many Strains of** *Coccidioides immitis*. *Amer. J. Clin. Path.* 1958, Mar., v. 29, No. 3, 291–5. [14 refs.]

"1. All of the 84 strains of *Coccidioides immitis* tested were resistant to at least 0·5 mg. of cycloheximide per ml. This finding indicates that the chance of failing to recover this fungus from clinical material, because of sensitivity to the antibiotic in the selective medium, is virtually negligible.

"2. When suspensions of *C. immitis* from infected tissue are serially diluted, and the dilutions are plated on mediums with or without cycloheximide, approximately the same recovery of fungous colonies is obtained on all of the mediums, even in dilutions that contain only a few culturable cells. The use of cycloheximide in medium, therefore, does not reduce the chance of isolating the fungus when only a few fungous elements are present.

"3. Some strains of *C. immitis* have unusually low virulence for experimental animals, but these strains are also resistant to cycloheximide. Growth on medium that contains this antibiotic may be used as an indication that a culture which seems to be *C. immitis*, but which did not produce disease in animals on the first attempt, may still prove to be pathogenic. In such instances, an unusually heavy suspension of the fungus should be injected into at least 5 animals. In this way, the incorporation of cycloheximide into the medium may help to distinguish between *C. immitis* and saprophytic fungi that resemble it culturally."

Klapper, Margaret S., Smith, D. T. & Conant, N. F. **Disseminated Coccidioidomycosis apparently cured with Amphotericin B.** *J. Amer. Med. Ass.* 1958, May 24, v. 167, No. 4, 463–6, 5 figs.

"Apparent cure was effected, after treatment with amphotericin B, of a patient with widespread musculoskeletal coccidioidomycosis of 10 years' duration. The drug was well tolerated with no untoward effects over a 14-month period. The lesions healed within three months and were well healed one year later."

Zontine, W. J. **Coccidioidomycosis in the Horse—A Case Report.** *J. Amer. Vet. Med. Ass.* 1958, June 1, v. 132, No. 11, 490–92. [19 refs.]

Maddy, K. T. **Disseminated Coccidioidomycosis of the Dog.** *J. Amer. Vet. Med. Ass.* 1958, June 1, v. 132, No. 11, 483–9, 11 figs. [16 refs.]

An account of 100 cases.

TROPICAL OPHTHALMOLOGY

d'Haussy, R., Rit, J. M. & Lagraulet, J. Contribution à l'étude des lésions du fond d'oeil dans l'onchocercose. [**Study of Lesions of the Fundus of the Eye in Onchocerciasis**] *Méd. Trop.* Marseilles. 1958, Mar.–Apr., v. 18, No. 2, 340–67, 10 figs. [16 refs.]

The authors have made a careful study of the ocular condition in 3 African soldiers in the French Sudan. While the anterior segment lesions follow the usual pattern, the fundus lesion varied with the patients. There is a thorough clinical description of the varied fundus lesions but, unhappily, their illustrations are black and white and poorly reproduced, and convey little to the reader. The visual fields, light adaptation, colour sense and electroretinography were all carefully studied in these patients as well as the usual onchocercal investigations. The authors classified the choroidoretinal changes as either " tapeto-retinal pseudo-degeneration " or irregular pigmentation of the fundus or hyaline deposits; also optic atrophy of various types.

There was little evidence to associate these conditions with onchocerciasis itself. They discuss the possibility of these fundus lesions being due to lack of vitamin A or vitamin B complex. They reject the suggestion that they could be due to syphilis, tuberculosis or trypanosomiasis and they are very doubtful that they are due to other forms of filariasis. They go on to say: " We ask ourselves if there does not exist also in the African a certain choroidoretinal fragility. We would not find it difficult to believe that the hyaline deposits are evidence of this fragility due perhaps to precocious arteriosclerosis. We find in Africa that other affections usually regarded as senile, such as cataract and glaucoma, tend to make their appearance unusually early " [abstracter's translation].

[This seems to the abstracter a very reasonable point of view.]

D. P. Choyce

MISCELLANEOUS DISEASES

Zigas, V. & Gajdusek, D. C. **Kuru: Clinical Study of a New Syndrome resembling Paralysis Agitans in Natives of the Eastern Highlands of Australian New Guinea.** *Med. J. Australia.* 1957, Nov. 23, v. 2, No. 21, 745–54. 10 figs. [10 refs.]

Approximately 5 years ago the regions south and east of Mount Michael in the southern portion of the eastern highlands of New Guinea were pacified by a series of contact patrols. In this region there had previously been inter-village and inter-tribal warfare, ritual killings, sorcery and cannibalism, practices which are now discouraged but of which remnants

survive. Those who have entered the region since pacification have found there a disease in which patients shiver and jerk their heads spasmodically, and have been told that they are the victims of sorcery. This disease has now been studied in 154 patients upon which this account is based.

The clinical features have been remarkably uniform and the first to develop is locomotor ataxia, followed by a swaying and weaving gait, and approximately a month later, by tremor which is aggravated by fatigue or excitement. Approximately one-third of the patients also complain of knee pains, headache, malaise, fever, cough or coryza. Some patients later develop wild athetoid involuntary movements in addition to the tremors and choreiform jerks. They become unable to walk without the support of a stick and in a month or two cannot maintain their equilibrium unassisted. While yet able to talk sensibly and, if carried from place to place, to continue social activity they thereafter rapidly deteriorate, become incontinent, often develop strabismus and when no longer capable of feeding themselves, die. Speech and intelligence are unaffected in the early stages but later dysarthria develops and the patient becomes emotionally labile. The whole course of the illness usually runs for 6 to 12 months and it appears to be uniformly fatal. Physical findings also include Rombergism, dysphasia, incoordination, nystagmus and adiodochokinesis. No laboratory findings distinctive of the disease have been reported.

Post-mortem examination has revealed widespread neuronal degeneration, particularly in the cerebellum and extrapyramidal system and less marked destruction of nerve cells in the anterior horns of the spinal cord, inferior olives, thalamus and pontine nuclei. Histological examination of other internal organs has revealed no abnormalities.

Treatment has been attempted with antibiotics, hormones, vitamins and BAL, but has to date been without effect. The BAL was used because it is effective in hepato-lenticular degeneration. Although the disease is clinically akin to this no evidence of liver involvement has been found in patients with kuru.

In considering the differential diagnosis the following conditions have been considered and have been excluded: hysteria, hepato-lenticular degeneration, hereditary cerebellar ataxia with spasticity (Marie's ataxia), olivo-cerebellar and olivo-ponto-cerebellar atrophy, parenchymatous cerebellar degeneration and conditions involving the basal ganglia, more particularly Parkinsonism and Huntington's chorea.

The area in which kuru occurs appears to be limited to the Eastern Highlands of New Guinea, and only members of the Fore tribe or those who have intermarried with Fore tribesmen are affected. Of the series here described three-quarters were adults and 130 were women, and it is therefore thought that this disease has been responsible for producing the current preponderance of males in the Fore population.

The cause of kuru is unknown but its age and sex distribution, the familial incidence and its seeming introduction through marriage to tribes

bordering on Fore territory all suggest a genetic predisposition. Although manganese and mercury poisoning produce a similar condition, extensive examinations of tissues for heavy metals has failed to reveal any abnormal amounts in these cases. *A. W. Woodruff*

Bergot, J., Charmot, G., Ravisse, P., Reynaud, R. & Vargues, R. Contribution africaine à l'étude de certaines hyper-gamma-globulinémies humaines. [**The African Contribution to the Study of Certain Hypergammaglobulinaemias**] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 125–37. [20 refs.]

There are in Africa many cases of hypergammaglobulinaemia and the authors have compared the findings recorded in the literature of 12 cases of this condition in Europeans with their findings in 10 cases in Africans. Though there is no difference in principle between the two, there must be a much higher incidence of the condition in Africans than in Europeans. The tendency to hypergammaglobulinaemia in Africa is in the opinion of the authors due to trypanosomiasis, leprosy, kala azar and other tropical diseases. In addition nutritional deficiencies tend to increase the activity of the gamma-globulin-forming tissues. It is suggested that these influences allow hypergammaglobulinaemia to come more easily to the fore in an African whereas in Europeans the predisposing factors are absent and therefore hypergammaglobulinaemia remains correspondingly more rare.
H. Lehmann

Payet, M., Camain, R. & Armengaud, M. Anatomie pathologique microscopique des cirrhoses des Africains. [**Histopathology of Cirrhosis in Africans**] *Méd. Afrique Noire.* Dakar. 1958, May 1–15, v. 5, No. 9, 199–205, 7 figs. [Numerous refs.]

See also p. 1040, McFadzean *et al.*, **Observations on the Anemia of Cryptogenetic Splenomegaly. I. Hemolysis. II. Expansion of the Plasma Volume.**

Feng, P. C. & Patrick, S. J. **Studies of the Action of Hypoglycin-A, an Hypoglycaemic Substance.** *Brit. J. Pharmacol. & Chemotherapy.* 1958, June, v. 13, No. 2, 125–30, 6 figs. [26 refs.]

" Some biological effects of hypoglycin-A, a compound isolated from the fruit of *Blighia sapida*, have been investigated. Administration of this compound to animals caused drowsiness progressing to coma, and when large doses were given the animals died. For the rat, the oral and intraperitoneal LD50 values were 98 and 97 mg./kg. respectively. Fasting

increased the toxicity considerably. The most outstanding biochemical change produced by hypoglycin-A was a delayed hypoglycaemia, the depth of which was related to the dose. The hypoglycaemia was preceded by exhaustion of liver glycogen. There were also smaller decreases in the glycogen stores of the heart, skeletal muscle and kidney, without any increase in blood pyruvate or lactate. Hypoglycin-A lessened the effect of adrenaline on blood glucose and decreased both glucose tolerance and insulin sensitivity. Hypoglycin-A also decreased the oxygen consumption and carbon dioxide production of the intact rat. All these effects are consistent with the hypothesis that the primary action of hypoglycin-A is the interference with glycogen production by the liver.''

[See this *Bulletin*, 1955, v. 52, 691, 935; 1956, v. 53, 371.]

D'Abrera, V. St. E. **''Tropical Eosinophilia''—Some Atypical Cases of Clinical Interest.** *Med. J. Malaya.* 1958, Mar., v. 12, No. 3, 559–62.

''Four atypical cases of Tropical Eosinophilia are described. One simulated rheumatic heart disease, another rheumatic fever with cardiac involvement while the third, an old case of Tropical Eosinophilia in the asthmatic phase, developed a deep-seated thrombophlebitis. All these cases responded to arsenicals. A fourth case of Tropical Eosinophilia in the bronchitic phase complicating pregnancy had a spontaneous recovery after a change of residence and climate. All four cases lived in filarial hyperendemic areas.''

Ganatra, R. D., Sheth, U. K. & Lewis, R. A. **Diethylcarbamazine (Hetrazan) in Tropical Eosinophilia.** *Indian J. Med. Res.* 1958, Mar., v. 46, No. 2, 205–22, 8 graphs. [21 refs.]

When left without treatment a patient with tropical eosinophilia is likely to have frequent remissions. To study the likelihood of such an improvement a control group of 30 patients were observed (without specific treatment). Of these only 3 had remissions, while the remainder showed no improvement. During this time the mean fall in the eosinophil count was 11%—less than in the treated groups.

It has already been established by Patel [this *Bulletin*, 1945, v. 42, 754] that oral carbarsone treatment is as effective as arsenic given by the parenteral route and much easier to administer. In a group of 27 so treated all except 4 showed satisfactory response in improvement of symptoms and fall of the eosinophil count after 10 days. The mean fall of 43% is significantly much higher than in the untreated series.

Several schedule schemes with diethylcarbamazine were tried out. 13 mgm./kgm. daily for 4 days was the first dosage tried and there were 2 failures, but temporary aggravation of symptoms in the initial stages was

more frequent than in the carbarsone group, and the mean fall in the eosinophil count was 58%. Then the same dose over a period of 8 days was tried in a group of 6 patients and all showed a favourable response. On the other hand 7 out of a total of 16 failed to respond to 6 mgm./kgm. daily for 4 days, but initial aggravation of symptoms was not frequent. The fact that only 10 had more than 50% fall in the total eosinophil count seems to prove that this drug is really no better than carbarsone. When, however, the same dose was given for 8 days the number of patients who failed to respond was significantly less and the mean fall in the eosinophil count was 71%. 17 patients were given 3 mgm./kgm. for 8 days and there were 4 failures. The mean fall in eosinophilia was 41% and 10 patients showed a fall of 50%. The results in this régime were comparable with those obtained with carbarsone.

It was then decided to try a single heroic dose of 26 mgm./kgm. when a severe but transitory reaction ensued, with fever, asthma and vomiting, resembling a modified Herxheimer reaction. Consequently the same dose was divided into three, and administered to a group of 19 patients at 4-hour intervals. In this series 3 returned with relapse after a remission lasting 10–12 months.

Diethylcarbamazine was uniformly effective in lowering the total eosinophil count and in the majority of patients produced a symptomatic cure. However, the numbers failing to respond in both the carbarsone and diethylcarbamazine groups were not significantly different, but relief of symptoms was usually earlier with diethylcarbamazine. Therefore a dose of 6 mgm./kgm. of diethylcarbamazine daily for 8 days can be recommended as giving better results than carbarsone at a dose of 0·5 gm. daily for 10 days. Diethylcarbamazine has also the advantage of not causing encephalopathy or myelopathy, which have been observed with arsenic.

[See also Danaraj, this *Bulletin*, 1958, v. 55, 920.]

Philip Manson-Bahr

PARASITOLOGY: GENERAL

Garnham, P. C. C. **Zoonoses or Infections common to Man and Animals.** *J. Trop. Med. & Hyg.* 1958, Apr., v. 61, No. 4, 92–4. [12 refs.]

The zoonoses are diseases common to man and animals, and all infective human diseases must have been zoonoses at one time, when the anthropoid ape was being transformed into *Homo sapiens*. Two of those infections still remain in their former state—*Plasmodium malariae* and *P. knowlesi* infections, which are still effective in animals and man.

The author divides the zoonoses into 2 goups:— (1) Infections in which man is essential for the life cycle of the parasite, the euzoonoses, of which there are only 2, namely infections with *Taenia solium* and *T. saginata*.

(2) Infections in which man is only accidentally involved, the parazoonoses, of which there are many and which may be immensely important. The parazoonoses are unstable and are continually evolving, and the author cites as instances plague and relapsing fever, which may change from an animal-vector-animal cycle to an epidemic or even pandemic man-vector-man cycle. Much the same may occur with yellow fever or trypanosomiasis, and the author emphasizes the capacity for change in this important group, with particular mention of the less well known example of toxoplasmosis.

This is an important thesis: it implies that care should be taken before an infection is conceived as being confined only to man, and the author gives the recent finding of an animal reservoir for *Loa* and the newly discovered association of animals and man in the ecology of species of *Wuchereria* as examples of a reversal of long-held opinion. He ends a stimulating Presidential Address (to the Tropical Hygiene Section of the 64th Congress of the Royal Society of Health) with a strong condemnation of the destruction of game as a method of controlling African trypanosomiasis, and with a sobering list of the infective misdemeanors of " man's best friend " the dog. *Charles Wilcocks*

Sankale, M., Le Viguelloux, J., Rivoalen, A. & Milhade, J. Les zoonoses au Soudan français. Étude d'ensemble. [**Zoonoses in the French Sudan**] *Bull. Méd. de l'A.O.F.* Dakar. 1958, Jan.–Mar., v. 3, No. 1, 30–39, 1 map.

Škrabalo, Z. & Deanović, Ž. Piroplazmoza pri človeku. [**Piroplasmosis in Man**] *Zdravstveni Vestnik.* Ljubljana. 1958, v. 27, No. 3, 119–23, 2 diagrams & 6 figs. [20 refs.]

[This is the case noted in this *Bulletin*, 1957, v. 54, 757.]

Maggioni, G., Bignami, A. & Ioppolo, C Contributo clinico ed anatomo-istologico alla conoscenza della polmonite interstiziale del lattante da *Pneumocystis carinii*. [**Interstitial Pneumonia of Infants**] *Giorn. di Malattie Infettive e Parassit.* 1958, Apr., v. 10, No. 4, 356–8.

The authors give clinical and morbid-anatomical and histological details of 4 fatal cases of interstitial pneumonia of infants due to *Pneumocystis carinii*, the eldest patient being 5 months of age. Only 1 baby was premature. In 2 cases the diagnosis was suspected during life but in the remainder it was only made at necropsy. There was a marked discrepancy between the clinical signs and symptoms, and the actual condition found post mortem. The pathological conditions found and the morbid histology are carefully described. The organism *Pneumocystis carinii* was

demonstrated in films and sections and in the alveolar exudate but the authors do not commit themselves as to whether the organism is causal.

W. K. Dunscombe

Ariztía, A., Bustamante, W., Moreno, L., Doberti, A., Román, Clara, Pizzi, T. & Díaz, María. **Interstitial Plasma Cell Pneumonia and** *Pneumocystis carinii*. *J. Pediatrics*. St. Louis. 1957, Dec., v. 51, No. 6, 639–45, 6 figs. [15 refs.]

The authors record the first 10 cases of interstitial plasma cell pneumonia in Chile in which *Pneumocystis carinii* was observed. All the affected children were badly nourished. 7 cases occurred in premature children. The onset occurred 3 to 6 months after birth. The clinical picture in 6 children was one of increasing dyspnoea, cyanosis and anorexia; in 4 the onset was sudden. There was moderate fever. Physical signs in the chest varied from nil to crepitations and rales. The cases were grouped clinically as interstitial plasma cell pneumonia (7), bronchopneumonia (2) and asphyxia with pneumothorax. The duration was 1 to 2 weeks or longer.

Laboratory tests were negative. Tests for cold agglutinations were not done. Radiological findings when present were characteristic. There was severe persistent interstitial emphysema which flattened and immobilized the diaphragm. In some patients there was micronodular infiltration of the posterior portions of both lungs. There was also peribronchial infiltration.

Patients were placed in an oxygen tent and treated without result with various antibiotics, combined with cortisone in 6 cases.

At autopsy [number not stated] the lungs were dark red and enlarged with emphysematous surface bullae. The cut surface was red, smooth and solid, with air only in the anterior borders. Histologically there was thickening and infiltration with " plasmatic " cells in the intra-alveolar and peribronchial septa. The alveoli contained " foamy exudate " often containing parasites. Parasites were found in lung sections and smears, in which the " rosette " formation was clearly seen [this *Bulletin*, 1956, v. 53, 1491].

B. G. Maegraith

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

See also p. 977, Fox, **Man-Biting Mosquitoes in Coastal Liberia.**

Kitzmiller, J. B. & Laven, H. **Tests for Multiple Fertilization in *Culex* Mosquitoes by the Use of Genetic Markers.** *Amer. J. Hyg.* 1958, Mar., v. 67, No. 2, 207–13.

An important question in any discussion of genetic ratios or hybridization experiments with mosquitoes concerns multiple fertilization: "Can one male inseminate more than one female and, more critically, can one female be inseminated by several males?"

By mating the two sexes and then isolating the females, it was established that for 3 forms of *Culex pipiens* (*pipiens*, *fatigans* and *molestus*) fertilization of several females by one male was possible; in one experiment, a single male fertilized 7 out of 8 females with which it was isolated.

The second problem was investigated by means of genetic markers—X-ray-induced mutants available for *C. molestus* and *C. fatigans*. It appears that each raft deposited represents a fertilization by sperm from a single male. No attempt was made to describe the physiological mechanism involved.

Several egg rafts may be laid by a single female but one insemination is sufficient for all subsequent layings. Up to 10 rafts have been laid by one *C. molestus* female in the course of 2 months following a single insemination. Control experiments indicated that parthenogenesis does not occur. *R. J. Wood*

Wharton, R. H. **Penang BHC-Resistant Strain of *Culex pipiens fatigans*.** *Bull. World Health Organization.* Geneva. 1958, v. 18, No. 4, 684.

See this *Bulletin*, 1955, v. 52, 1025.

Bovingdon, H. H. S. **An Apparatus for screening Compounds for Repellency to Flies and Mosquitoes.** *Ann. Applied Biol.* 1958, Mar., v. 46, No. 1, 47–54, 2 figs.

A description is given of an apparatus designed to assess the contact stimuli to flies or mosquitoes of compounds of low vapour pressure applied to glass surfaces.

To test the effectiveness of a compound, a count is made of the numbers of insects settling on treated and untreated glass plates at intervals over a period of 40 minutes and under conditions that minimize varying disturbing factors. Then, by dividing the total numbers on the untreated plates by those on the treated plates, the so-called "repellence quotient" is obtained, which must reach a certain value before significance is assured.

Typical results obtained by this apparatus are given and include a detailed determination of the repellency of butoxypolypropylene glycol (MW 800). *R. J. Wood*

Snow, W. E., Pickard, E. & Jones, C. M. **Observations on the Activity of *Culicoides* and other Diptera in Jasper County, South Carolina.** *Mosquito News.* 1958, Mar., v. 18, No. 1, 18–21.

Saccà, G. & Benetti, M. P. Fattori ambientali e fisiologici della inseminazione in *Musca domestica* L. e nelle sue subspecie. [**Environmental and Physiological Factors of Insemination in *Musca domestica* L. and in its Subspecies**] *Rendiconti Istituto Superiore di Sanità.* Rome. 1958, v. 21, Pt. 2, 110–19. [10 refs.]

The English summary appended to the paper is as follows:—

"The authors have tested the influence of some environmental and physiological factors on the insemination in *Musca domestica domestica* L., *Musca domestica curviforceps* Saccà and Rivosecchi, and *Musca domestica cuthbertsoni* Patton.

"The experiences showed clear differences between the three forms; *cuthbertsoni* seems to need a longer time to reach sexual maturity and it does not mate if not kept at a certain light intensity, in a relatively wide space and at a relatively high temperature. In some strains of *cuthbertsoni* some of these characters are modified after a few generations. *Domestica* is the subspecies which can mate and be fertilised also in particularly unfavorable conditions; *curviforceps* has shown intermediate needs between the two above mentioned forms."

Ascher, K. R. S., with the technical assistance of A. Ben-Shmuel. **The Attraction of the Levant Housefly *Musca vicina* Macq. to Natural Breeding Media.** *Acta Tropica.* Basle. 1958, v. 15, No. 1, 1–14, 2 figs. [25 refs.]

Flies from a laboratory strain of *Musca vicina*, housed either in a Peet-Grady chamber or a 90 × 60 × 47 cm. cage, were given the choice of entering a number of cylindrical glass traps (of the type described by Dethier, *J. Econom. Entom.*, 1955, v. 48, 235) containing various attractive substances.

Among flies nourished exclusively on sugar and water there was a strong attraction of the females for pig manure, rather than cow manure, horse manure, sheep manure or sugar. This reaction was not so intense on the first day after emergence but thereafter increased markedly. Virgin females showed an attraction equal to that of fertilized females. Flies fed on milk were sluggish in their response, but when sugar feeding was resumed, their capacity to react rose to the normal level after 48 hours.

The so-called "fly factor" [this *Bulletin*, 1953, v. 50, 573], an attractive substance secreted and deposited on feeding sites by *Musca* and *Phormia*, was shown to have no effect in the presence of such a powerful attractant as pig manure. A number of patent "fly attractants" gave

negative results. However, a 5% suspension of baker's yeast aged for 1 week in a closed container was shown to be very attractive to female flies and a 20% solution of ammonium carbonate proved a most powerful attractant to both sexes. *R. J. Wood*

Alexander, B. H., Barker, R. J. & Babers, F. H. **The Phosphatase Activity of Susceptible and Resistant House Flies and German Cockroaches.** *J. Econom. Entom.* 1958, Apr., v. 51, No. 2, 211–13.

" Differences in the phosphatase activity of susceptible and DDT-resistant house flies (*Musca domestica* L.) and susceptible and chlordane-resistant cockroaches (*Blattella germanica* (L.) and *Periplaneta americana* (L.)) have been measured. The phosphatase analysis was based upon the colorimetric determination of *beta*-naphthol liberated from sodium *beta*-naphtholphosphate.

" Although significant differences were found in the acid and alkaline phosphatase activity between the sexes of both resistant and susceptible insects and also differences in the acid phosphatase activity between females of one DDT-resistant and one susceptible strain of insects, it was concluded that these differences were due to strain variations rather than to resistance."

Esslinger, J. H. **Effects of the Screw-Worm on Guinea Pigs.** *J. Parasitology.* 1958, Apr., v. 44, No. 2, 201–9, 4 figs.

Ansari, M. A. R. **Some Observations on Caterpillar Dermatitis.** *Pakistan J. of Health.* 1957, Oct., v. 7, No. 3, 105–14, 4 figs.

3 cases are described by the author of allergic responses in patients presumed to have been in contact with urticating caterpillars. 2 of the cases were mild and only the third required the use of an antihistamine drug in treatment.

A description of the appearance and habits of the caterpillars of the " ber moth ", represented by *Euproctus* [this almost certainly should be *Euproctis*] *lunata* and *E. fraterna*, is given and also of *Metanastria hyrtaca* Cram.

The structure and mode of action of the urticating hairs of these caterpillars are described and the appearance of a row of caterpillars of *M. hyrtaca* is figured with the rather quaint caption " presenting arms to some dignitary or preying without a leader ".

General principles of treatment of patients who have come into contact with urticating caterpillars consists of washing the skin to remove remaining hairs and their secretions and the administration of antihistamines in severe cases. Mention is also made of bites and stings by other arthropods and their treatment. *E. R. Nye*

Arthur, D. R. **New Species of *Ixodes* Ticks from Eastern Africa, with a Description of the Male and Nymph of *Ixodes oldi* Nuttall, 1913.** *Parasitology.* 1958, May, v. 48, Nos. 1/2, 38–69, 91 figs.

"The following new species of *Ixodes* from eastern Africa are described and figured: *I. rotundatus*, *I. auriculaelongae*, *I. nchisiensis*, *I. latus*, *I. loveridgei*, *I. spinae*, and *I. euplecti*.

"The female of *I. oldi* is redescribed and the hitherto unknown male and nymph are described and figured. Some consideration is given to two specimens from Uganda which differ in certain particulars from typical specimens from East and West Africa."

DeOreo, G. A. **Pigeons acting as Vector in Acariasis caused by *Dermanyssus gallinae* (DeGeer, 1778).** *Arch. Dermat.* 1958, Apr., v. 77, No. 4, 422–9, 9 figs. [18 refs.]

14 cases of dermatitis attributed to contact, with bites, of *Dermanyssus gallinae* in people in their suburban homes are reported from the United States. Photographs amplify the clinical manifestations described in tables and in the text. A general review of the literature on dermatitis from blood-sucking mites is given, together with an account of the biology of *D. gallinae*. Emphasis is on the apparently common occurrence of this chicken-mite on town pigeons and the trend of pigeons to nest more than formerly in suburban houses rather than central office blocks. Ultra-high frequency sound devices to discourage the pigeons from frequenting the central areas are reported to be the cause of this trend. Associated with this, there seems an increased incidence of acariasis due to *D. gallinae*.

[See also this *Bulletin*, 1958, v. 55, 597.] *D. S. Bertram*

Favorite, F. G. **The Imported Fire Ant.** *Pub. Health Rep.* Wash. 1958, May, v. 73, No. 5, 445–8, 3 figs.

Solenopsis saevissima richteri, an ant of South America, was probably introduced about 1920 into the United States at Mobile, Alabama. It is now dispersed widely from Texas to Florida and northwards as far as Tennessee. Its nests are troublesome obstructions, damaging farm equipment and spoiling decorative lawns. Its sting is very painful and, of 300 of the author's cases, 5 (2 adults, 3 children) showed anaphylactoid reactions after the fourth or fifth sting at intervals. Effective treatments were 1:1000 epinephrine parenterally at 0·1 cc. for infants to 1·0 cc. for children over 100 lb., and 1·5 cc. injectable benadryl solution (15 mgm.) for adults intramuscularly. Antihistaminic preparations were given also to adults and children orally.

The most promising control measure is scatter of residual insecticides (dieldrin, heptachlor, chlordane) over infested ground, followed by watering-in, and direct application of insecticide to excavated nests. This is effective for 2 years, but reinfestation may then require re-treatment.

The figures are a sketch map of distribution, characters for differentiating 3 related ant species, and the appearance of a human leg after numerous stings. *D. S. Bertram*

Lofgren, C. S., Keller, J. C. & Burden, G. S. **Resistance Tests with the Bed Bug and Evaluation of Insecticides for Its Control.** *J. Econom. Entom.* 1958, Apr., v. 51, No. 2, 241–4.

Laboratory tests show resistance to DDT in bed-bugs (*Cimex lectularis*) from Japan (Kuskoa strain), Ohio, two American naval vessels and, to a lesser extent, in bed-bugs from Korea. Bugs from house infestations in Denver, Colorado, were susceptible.

Mortality of strains resistant to DDT was as little as 10% within 48 hours of a 2-hour exposure period, and 22% after a week continuously on treated test cloths. Lindane gave, however, 100% kill within 24 hours of a 2-hour exposure, and chlordane, dieldrin and aldrin were just as effective within 48 hours. Methoxychlor was useless. In tests of residual effectiveness (with normally susceptible bugs) a half-hour exposure to malathion or pyrethrins with piperonyl butoxide still gave, after 24 weeks, 100% kill within 24 hours. The descending order of effectiveness (after a 2-hour exposure) was Am. Cyanamid 4124, lindane, dieldrin, Diazinon, chlorthion, Dow ET-57, chlordane and Dipterex. The only insecticides giving a 100% kill (within 24 hours of a 24-hour exposure) 28 weeks after preparation of the deposits were dieldrin, malathion and pyrethrins with piperonyl butoxide. DDT was never more than 80% effective after the first week in corresponding tests, with as low as a 15% kill by the 28th week. Although a few bugs were found for a week after spraying of rooms and beds in bug-infested dwellings of Denver with one or other of these several insecticides, no more bugs were found alive during a further week except for newly hatched bugs in pyrethrin-treated rooms. In Orlando, Florida, follow-up after malathion or Am. Cyanamid sprays was continued for 9 months but no live bugs were found except in the 2 days after treatment. *D. S. Bertram*

Quarterman, K. D. & Schoof, H. F. **The Status of Insecticide Resistance in Arthropods of Public Health Importance in 1956.** *Amer. J. Trop. Med. & Hyg.* 1958, Jan., v. 7, No. 1, 74–83, 1 fig. [Numerous refs.]

The authors discuss insecticide resistance up to 1956. After a detailed review of the relevant literature, tables are presented listing numbers of confirmed and unconfirmed cases of insecticide resistance among some 38 species from all parts of the world. Of these there are 22 confirmed instances among mosquitoes (17 species), 9 confirmed instances among 3 species of fly, and 14 cases in other insect species. Unconfirmed reports

include a large number among fleas and bring the list of resistant mosquitoes up to 19.

These results are presented according to geographical area and it is clear that of all the areas discussed, North America has produced the largest number of resistant species.

A small section is devoted to the relatively few cases of behaviouristic resistance. [See Busvine, this *Bulletin*, 1957, v. 54, 767.]

R. J. Wood

Berger, R. S. & Randolph, N. M. **The Determination of Some Insecticidal Residues in Soils by Bioassay.** *J. Econom. Entom.* 1958, Apr., v. 51, No. 2, 186–7. [10 refs.]

Kilgemagi, U., Morrison, H. E., Roberts, J. E. & Bollen, W. B. **Biological and Chemical Studies on the Decline of Soil Insecticides.** *J. Econom. Entom.* 1958, Apr., v. 51, No. 2, 198–204, 3 figs. [14 refs.]

Bollen, W. B., Roberts, J. E. & Morrison, H. E. **Soil Properties and Factors Influencing Aldrin-Dieldrin Recovery and Transformation.** *J. Econom. Entom.* 1958, Apr., v. 51, No. 2, 214–19, 1 fig. [20 refs.]

Booth, A. H. **The Zoogeography of West African Primates: A Review.** *Bull. Inst. Français d'Afrique Noire.* 1958, Apr., v. 20, No. 2, 587–622, 21 figs. [43 refs.]

MISCELLANEOUS PAPERS

Manson-Bahr, P. **The Diagnostic Eye.** *J. Trop. Med. & Hyg.* 1958, May, v. 61, No. 5, 111–23.

In this paper Sir Philip distils the rich experience accumulating from nearly 40 years of consulting practice in London. He begins by relating some of the diagnostic wisdom imparted by his famous father-in-law and makes the useful point that " one should not always try to explain away the intricacies of the case on a tropical basis ".

There follows a highly concentrated and detailed account of the various essentials of clinical examination under the three headings of interrogation, inspection and examination. Here the reader will find innumerable practical points relating to the various systems, regions and organs, the physical signs and manifestations and their implications. Throughout, the differential significance of the various points is stressed. The paper ends with some salutary examples of mis-diagnosis.

The amount of information contained in this paper is tremendous: but the zest and characteristically graphic phrases of the author protect it from the monotony which such a compendium might acquire in less practised hands. Clinicians in, from and concerned with the tropics will be grateful for this admirable exposition of clinical *expertise*.

H. J. O'D. Burke-Gaffney

WADDY, B. B. **Frontiers and Disease in West Africa.** *J. Trop. Med. & Hyg.* 1958, Apr., v. 61, No. 4, 100–107, 4 figs. [13 refs.]

Despite the arbitrary interterritorial boundaries formulated in the 1890's around conference tables by diplomats of Great Britain, France and Germany, there exists but a single important epidemiological boundary throughout West Africa. This is constituted by the junction of the coastal rain-forest belt with the savannah of the north, which itself gradually merges with the true desert of the Southern Sahara. Diseases tend to be segregated along fairly constant belts of latitude from the Atlantic coast to the Sudan, owing to the constancy of the climatic factors which determine their range. Within the Sudan itself the Sudd may constitute an epidemiological barrier between north and south. The credit for pioneering epidemiological studies in rural areas must be accorded to the French, since the earliest published surveys are those of JAMOT (1915) [see also this *Bulletin*, 1935, v. 32, 684] on trypanosomiasis in French Equatorial Africa and in the Cameroons. The value of his work, and the force of its impact, can be appreciated from the fact that he discovered 5,000 cases among 90,000 persons in the former area and 105,902 cases in 355,000 inhabitants of the Cameroons.

Rural Africans show a healthy disregard for interterritorial boundaries, which cut across the distribution of tribal groups, and their love of travel is in no way thwarted by them. The closure of frontiers as a means of epidemic control merely diverts pedestrian traffic to footpaths and tracks which by-pass every control post, thus deflecting the course of epidemics through remote areas where detection and control present greater difficulties than would be met were the diseases to manifest themselves on recognized routes of communication.

Cerebrospinal meningitis appears to have a true home or endemic focus in northern Uganda and the southern Sudan, and it seems that all 4 epidemic waves of this disease, which have spread across West Africa

within the last 80 years, have originated there. Only the most recent cycle has received adequate study, and the author has prepared a very instructive map which demonstrates the slow march of this epidemic from the Upper Nile in 1927 *via* Kordofan (1932), Darfur (1935), then to French Lake Chad territory (1936), and to the Bornu and Katsina emirates of Northern Nigeria in 1937. A western spread along the caravan routes which skirt the southern fringes of the Sahara carried the epidemic to the Northern Territories of the Gold Coast in 1939, to Sierra Leone in 1941 and to its extinction at the Atlantic coast in the Gambia and Senegal later in the same year. The futility of frontier closure as a control measure has already been pointed out, but the effectiveness of mass prophylaxis by single doses of a depot penicillin or of sulphonamides has more recently been demonstrated in the Sudan. Such methods might eventually be applied in the endemic focus, or where suitable bottlenecks occur along routes of communication, such as Ouaddai, in French Equatorial Africa, on which converge the caravan routes from the Sudan, or the Niger crossings. Such prophylactic action in advance of an epidemic will require the rapid international dissemination of reliable medical information.

Smallpox in epidemic form has not troubled West Africa for a number of years. This satisfactory control is attributed by the author to the generous interpretation by both British and French authorities of a recommendation by a West African Interterritorial Medical Conference, held in 1946, that universal vaccination should be carried out, though in frontier areas only. A fascinating map illustrates the emergence of epidemic smallpox in 3 remote districts adjacent to a frontier whose regular approach roads had been closed as a control measure.

Turning to trypanosomiasis, the author points out that the tsetse fly is a relatively inefficient vector, whose range is limited strictly by climatic factors, which requires a prolonged, uninterrupted blood meal in order to acquire infection from a host, followed after an incubation period by another leisurely meal on a susceptible host in order that the infection may be passed on. The author holds that though *T. rhodesiense* may be carried from game animals to man by *Glossina morsitans*, since the disease in the latter is acute, rapidly immobilizing and killing him, there is little chance of its epidemic spread to other human beings in his neighbourhood. [For another opinion on this see Fairbairn, this *Bulletin*, 1948, v. 45, 1]. *T. gambiense* trypanosomiasis, however, through its chronicity in the human host, carries a greater risk of wide dissemination. Since transmission requires intimate and sustained association of a tsetse population with a human population containing infected and susceptible individuals, it is confined in its epidemic form to savannah areas, where such favourable circumstances obtain at waterholes and river crossings. Similar intimate contact does not occur in forested areas, through the humid atmosphere of which tsetse flies can range widely and can find an abundant range of animals on which to feed as an alternative to man. Despite the spectacular proportions of the epidemic which killed 100,000

or half the lakeside population of Lake Victoria at the beginning of the present century, it is probable that the less dramatic *T. gambiense* epidemics of West Africa have caused a far greater loss of life. In this area, *gambiense* trypanosomiasis spreads along river systems and along roads: a map illustrates such a spread down the Volta river system during recent years from an endemic area where boundaries were strictly confined to the headwaters in 1900.

Though mass blindness in riverine communities was noted by District Commissioners in the Northern Territories of the Gold Coast as early as 1907, its association with the chronic lichenifying skin condition, craw-craw, and their joint attributability to onchocerciasis were first recognized by Hissette [see this *Bulletin*, 1933, v. 30, 377] in the Belgian Congo in 1932. The author, noting an incidence of blindness attributable to onchocerciasis of about 10% (with over 20% of blindness in adult males) in certain villages of the northern Gold Coast, enquired as to the situation in the adjacent French upper Volta province, and was told of an even graver endemicity, with blindness rates of as high as 35%. Unlike the riverine tsetse fly the *Simulium* species can endure a dry atmosphere and have a long flight range. Nevertheless, a limited control of their breeding areas can be achieved by the use of DDT, to which both fly and larva are highly susceptible. The author does not believe that there exists any natural barrier to the breeding and spread of *Simulium* from the western reaches of the Niger to the Nile, and points out that no eradication scheme of practicable proportions can be permanently successful unless such barriers can be established and maintained in order to prevent recolonization of areas cleared of the fly. The author is confident that by international endeavour it would prove possible to eliminate the disease from the Volta river system, which at present owns the distinction of being the most intensely endemic onchocerciasis area in the world.

[Those who read this admirable and provocative review in the original will be amply rewarded. The abstracter would point out that the call for the international dissemination of medical information has now been met by the monthly *Epidemic Diseases Bulletin* issued by the World Health Organization, while the Federal Government of Nigeria circulates an informative monthly statement on the same basis.]

[See also *Bull. Hyg.*, 1954, v. 29, 454, 1028.] *J. H. Walters*

REPORTS AND SURVEYS

Moçambique. Missão de combate às tripanossomíases. Relatório anual de 1955 [de Andrade Silva, M. A.]. [**Annual Report for 1955 of the Trypanosomiasis Commission**] 87 pp., 10 figs. on 5 pls., 2 graphs (1 folding) & 3 coloured maps (2 folding). [18 refs.] 1958. Lourenço Marques: Imprensa Nacional de Moçambique.

This report follows the scheme of its predecessors [this *Bulletin*, 1957, v. 54, 1028]. The trypanosomiasis service employs 11 doctors, 9 veterinary surgeons and 1 biologist, with auxiliary staff.

The identification of tsetse flies is detailed in the various regions of the country, *Glossina austeni*, *G. brevipalpis*, *G. morsitans* and *G. pallidipes* being widely prevalent. During the year 697,086 persons were examined and 170 new cases of *T. rhodesiense* trypanosomiasis were diagnosed (a reduction of 97 on the previous year), most of them in the district of Cape Delgado; the total infection rate was 0·2 per 1000 persons examined.

Pentamidine prophylaxis is practised, and a first injection was given to 11,824 persons in the area of Mocimboa de Praia. 25 new cases were diagnosed, against 78 in 1954 and 104 in 1953.

Most of the report relates to trypanosomiasis of animals. There are, as usual, several large coloured maps showing the distribution of the various species of *Glossina*. *Charles Wilcocks*

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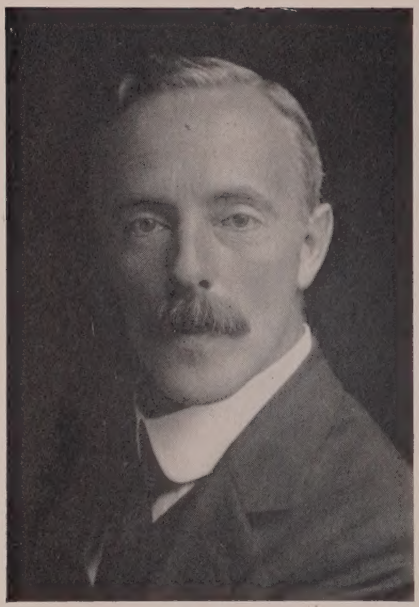
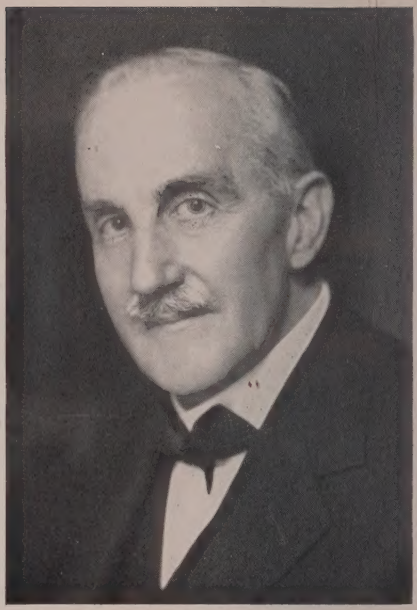


Sir Arthur Bagshawe, C.M.G., B.A., M.B., D.P.H.
(b. 1871 d. 1950).
Director, 1908-1935



Sir Harold Scott, K.C.M.G., M.D., F.R.C.P., D.P.H., D.T.M. & H., F.R.S. (Ed.)
(b. 1874 d. 1956)
Assistant Director 1930-1935
Director 1935-1942

50th Anniversary

The Bureau of Hygiene and Tropical Diseases celebrates this month the 50th anniversary of the issue of its first publication, the *Sleeping Sickness Bureau Bulletin*, in October 1908.

The Director of the Bureau was Dr. Arthur William Garrard Bagshawe who had been seconded from the Uganda Medical Staff, and the *Bulletin* was compiled and written by him. He set a pattern which has in essence been followed in all subsequent publications of the Bureau. A brief outline of the history of the Bureau was contributed to the *Tropical Diseases Bulletin*, 1953, v. 50, pp. 1-2, by Captain R. L. Sheppard, O.B.E., who was secretary from 1912 to 1953.

We reproduce above the photographs of the first two Directors of the Bureau as a tribute to their work and example.